1449/1
Matematik
Kertas 1
Oktober 2021
$1\frac{1}{2}$ jam

KEMENTERIAN PENDIDIKAN MALAYSIA
PEJABAT PENDIDIKAN DAERAH PASIR GUDANG

MODUL PEPERIKSAAN PERCUBAAN SPM 2021
SET 1

MATEMATIK
Kertas 1
Satu jam tiga puluh minit

JANGAN BUKA MODUL INI SEHINGGA DIBERITAHU

1. *Modul ini mengandungi* 40 *soalan dalam dwibahasa.*
2. *Jawab semua soalan.*
3. *Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.*
4. *Satu senarai rumus disediakan di halaman* 2 *dan* 3.
5. *Anda dibenarkan menggunakan kalkulator saintifik.*

Modul ini mengandungi 23 halaman bercetak.

RUMUS MATEMATIK

MATHEMATICAL FORMULAE

Rumus-rumus berikut boleh membantu anda untuk menjawab soalan. Simbol-simbol yang diberi adalah yang biasa digunakan.

The following formulae may be helpful in answering the questions. The symbols given are the ones commonly used

PERKAITAN

RELATIONS

1 $a^m \times a^n = a^{m+n}$

2 $a^m \div a^n = a^{m-n}$

3 $(a^m)^n = a^{mn}$

4 $A^{-1} = \frac{1}{ad-bc}\begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$

5 Jarak / *Distance* = $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

6 Titik Tengah / *midpoint* $(x, y) = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

7 Purata laju = $\frac{\text{jarak yang dilalui}}{\text{masa yang diambil}}$

Average speed = $\frac{distance\ travelled}{time\ taken}$

8 Min = $\frac{\text{hasil tambah nilai data}}{\text{bilangan data}}$

Mean = $\frac{sum\ of\ data}{number\ of\ data}$

9 Min = $\frac{\text{hasil tambah (nilai titik tengah kelas} \times \text{kekerapan)}}{\text{hasil tambah kekerapan}}$

$Mean = \frac{sum\ of\ (midpoint \times frequency)}{sum\ of\ frequencies}$

10 Varians / *Variance*, $\sigma^2 = \frac{\Sigma(x-\bar{x})^2}{N} = \frac{\Sigma x^2}{N} - \bar{x}^2$

11 Varians / *Variance*, $\sigma^2 = \frac{\Sigma f(x-\bar{x})^2}{\Sigma f} = \frac{\Sigma f x^2}{\Sigma f} - \bar{x}^2$

12 Sisihan piawai / *Standard deviation*, $\sigma = \sqrt{\frac{\Sigma(x-\bar{x})^2}{N}} = \sqrt{\frac{\Sigma x^2}{N} - \bar{x}^2}$

13 Sisihan piawai / *Standard deviation*, $\sigma = \sqrt{\frac{\Sigma f(x-\bar{x})^2}{\Sigma f}} = \sqrt{\frac{\Sigma f x^2}{\Sigma f} - \bar{x}^2}$

14 TeoremPithagoras/*Pythagoras Theorem*

$c^2 = a^2 + b^2$

15 $P(A) = \frac{n(A)}{n(S)}$

16 $P(A') = 1 - P(A)$

17 $m = \frac{y_2 - y_1}{x_2 - x_1}$

18 $m = -\frac{\text{pintasan-}y}{\text{pintasan-}x}$

$m = -\frac{y\text{-}intercept}{x\text{-}intercept}$

19 Faedah mudah / Simple interest, *I* =*Prt*

20 Nilai matang / *Maturity value*

$MV = P\left(1+\frac{r}{n}\right)^{nt}$

21 Jumlah bayaran balik / *Total amount payable*

A = *P* + Prt

BENTUK DAN RUANG
SHAPES AND SPACE

1 Luas trapezium = $\frac{1}{2}$×hasil tambah dua sisi selari×tinggi

Area of trapezium = $\frac{1}{2} \times sum\ of\ parallel\ sides \times height$

2 Lilitan bulatan = $\pi d = 2\pi j$
Circumference of circle = $\pi d = 2\pi r$

3 Luas bulatan = πj^2
Area of circle = πr^2

4 Luas permukaan melengkung silinder = $2\pi jt$
Curved surface area of cylinder = $2\pi rh$

5 Luas permukaan sfera = $4\pi j^2$
Surface area of sphere = $4\pi r^2$

6 Isipadu prisma tegak = Luas keratan rentas×panjang
Volume of right prism = cross sectional area×length

7 Isipadu silinder = $\pi j^2 t$
Volume of cylinder = $\pi r^2 h$

8 Isipadu kon = $\frac{1}{3}\pi j^2 t$

Volume of cone = $\frac{1}{3}\pi r^2 h$

9 Isipadu sfera = $\frac{4}{3}\pi j^3$

Volume of sphere = $\frac{4}{3}\pi r^3$

10 Isipadu piramid tegak = $\frac{1}{3} \times$ luas tapak × tinggi

Volume of right pyramid = $\frac{1}{3} \times base\ area \times height$

11 Hasil tambah sudut pedalaman poligon = $(n - 2) \times 180^\circ$
Sum of interior angles of a polygon = $(n - 2) \times 180^\circ$

12 $\frac{\text{panjang lengkok}}{\text{lilitan bulatan}} = \frac{\text{sudut pusat}}{360^\circ}$

$\frac{arc\ length}{circumference\ of\ circle} = \frac{angle\ subtended\ at\ centre}{360^\circ}$

13 $\frac{\text{luas sektor}}{\text{luas bulatan}} = \frac{\text{sudut pusat}}{360^\circ}$

$\frac{area\ of\ sector}{area\ of\ circle} = \frac{angle\ subtended\ at\ centre}{360^\circ}$

14 Faktor skala, $k = \frac{PA'}{PA}$

Scale factor, $k = \frac{PA'}{PA}$

15 Luas imej = k^2×luas objek
Area of image = k^2×*area of object*

Jawab **semua** soalan.
*Answer **all** questions*.

1. Diberi ketinggian Menara Kuala Lumpur adalah 421 meter. Tukarkan 421_{10} kepada asas tujuh.
Given that the height of Kuala Lumpur Tower is 421 metre*. Convert* 421_{10} *to base seven.*

A 1141_7
B 1411_7
C 1114_7
D 4111_7

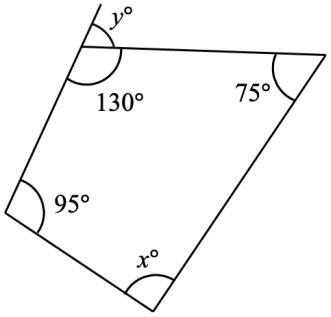
2. Hitung nilai bagi $452_6 + 135_6$.
Calculate the value of $452_6 + 135_6$.

A 587_6
B 600_6
C 1301_6
D 1031_6

3. Sebuah syarikat hiburan telah menganjurkan sebuah festival musik selama lima hari. Purata pengunjung yang hadir adalah 500 orang dewasa dan 300 orang kanak-kanak. Jika setiap pengunjung yang hadir dikenakan bayaran masuk sebanyak RM5.00 untuk dewasa dan RM2.00 untuk kanak-kanak, hitung jumlah keuntungan hasil daripada jualan tiket masuk untuk festival musik tersebut dan nyatakan dalam bentuk piawai.
An entertainment company has organized a five -day music festival. The average visitor in attendance was 500 *adults and* 300 *children. If each visitor present is charged an entrance fee of* RM5.00 *for adults and* RM2.00 *for children, calculate the total profit from the sale of entrance tickets for the music festival and state in standard form.*

A 2.5×10^3
B 6.0×10^2
C 3.1×10^3
D 1.55×10^4

4. Rajah 1 di bawah menunjukkan sebuah poligon.
Diagram 1 *below shows a poligon.*

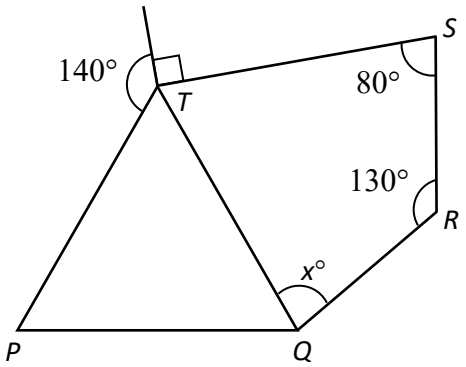


Rajah 1
Diagram 1

Hitung nilai bagi $x° + y°$.
Calculate the value of $x° + y°$.

A 50°
B 60°
C 110°
D 190°

5. Dalam Rajah 2, *PQT* ialah segitiga sama sisi.
In the Diagram 2*, PQT is a equilateral triangle.*

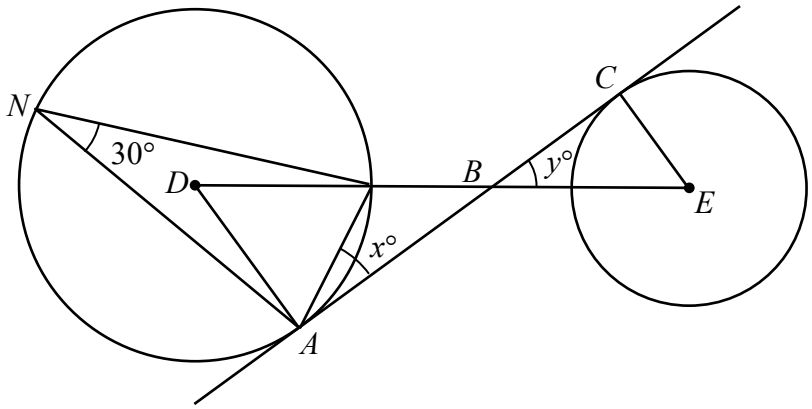


Rajah 2
Diagram 2

Cari nilai bagi $x°$.
Find the value of $x°$.

A 60°
B 70°
C 80°
D 90°

6. Dalam Rajah 3, *ABC* ialah tangen sepunya kepada bulatan berpusat *D* dan *E*. *DBE* ialah garis lurus. *AD* dan *CE* ialah jejari bulatan.
In Diagram 3*, ABC is a common tangent to the circles with centre D and E. DBE is a straight line. AD and CE is the radius of the circles.*

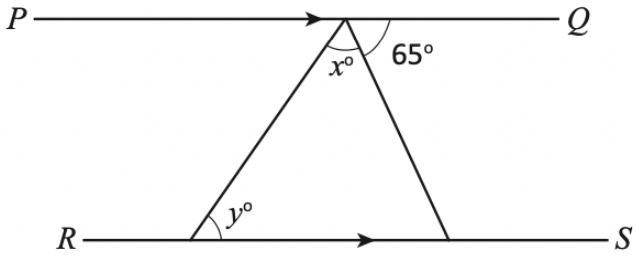


Rajah 3
Diagram 3

Cari nilai $x° + y°$.
Find the value of $x° + y°$.

A 60°
B 54°
C 50°
D 30°

7. Dalam Rajah 4 di bawah, *PQ* adalah selari dengan *RS*.
In the Diagram 4 *below, PQ is parallel to RS.*



Rajah 4
Diagram 4

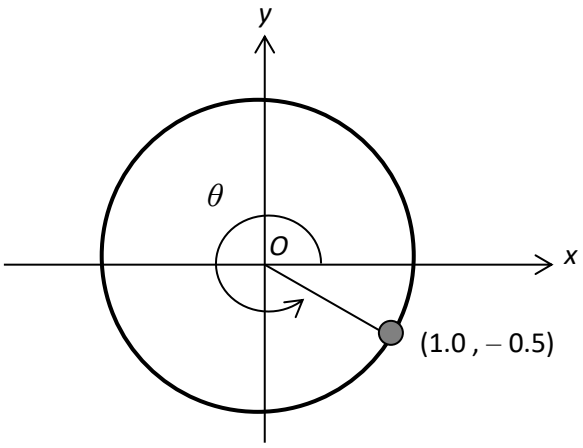
Cari nilai $x° + y°$.
Find the value of $x° + y°$.

A 65°
B 115°
C 130°
D 135°

8. Diberi bahawa P = {faktor bagi 16} dan Q = {nombor perdana yang kurang daripada 15}.
Senaraikan semua unsur bagi $P \cup Q$.
Given that P = {factors of 16}and Q = {prime numbers less than 15}.
List all the elements of $P \cup Q$.

A { 1, 2, 3, 4, 8, 16 }
B { 2, 3, 5, 7, 8, 11,18}
C { 2, 3, 4, 5, 7, 11, 13, 16}
D { 1, 2, 3, 4, 5, 7, 8, 11, 13, 16 }

9. Rajah 5, *O* ialah pusat bagi satu bulatan.
Diagram 5, O is the centre of a circle.

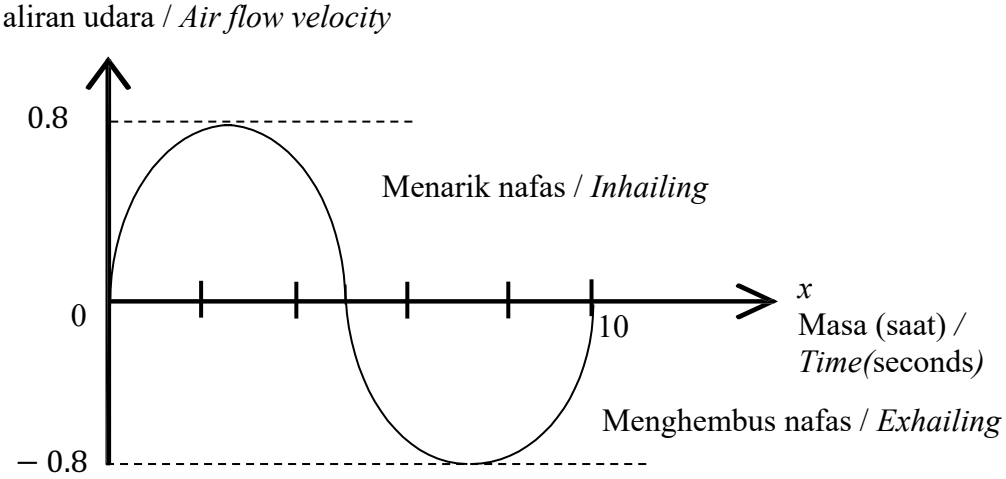


Rajah 5
Diagram 5

Nilai bagi tan θ ialah
Value of tan θ is

A 0.8
B – 0.5
C – 0.75
D – 1.33

10. Rajah 6 di bawah menunjukkan satu kitaran pernafasan yang lengkap. Kitaran ini terdiri daripada proses menarik nafas dan menghembuskan nafas. Kitaran ini berlaku setiap 10 saat. Halaju aliran udara adalah positif apabila nafas ditarik, dan negatif apabila menghembuskan nafas. Halaju ini diukur dalam liter per saat.
Diagram 6 *below shows a complete respiratory cycle. This cycle consists of the process of inhaling and exhaling. This cycle occurs every* 10 *seconds. The airflow velocity is positive when inhaled, and negative when exhaling. This velocity is measured in liters per second.*



Rajah 6
Diagram 6

Nyatakan fungsi dalam bentuk $y = a\ sin\ bx + c$ yang memodelkan aliran udara dalam kitaran pernafasan normal yang ditunjukkan jika y mewakili halaju aliran udara dan x mewakili tempoh masa.
State a function in the form $y = a\ sin\ bx + c$ *that models airflow in a normal respiratory cycle shown if y represents the velocity of airflow and x represents a period of time.*

A $y = 0.8\ sin\ 36x$
B $y = 0.8\ sin\ 72x$
C $y = 8\ sin\ 72x$
D $y = 8\ sin\ 36x$

11. Puan Salmiza menyimpan wang sebanyak RM5 800 di Bank Teratai dengan kadar faedah 3% setahun. Berapakah faedah yang diperolehi oleh Puan Salmiza selepas setahun?
Mrs. Salmiza keeps RM5 800 *in Bank Teratai with an interest rate of* 3% *per annum. How much benefit does Mrs. Salmiza get after one year?*

A RM 580
B RM 348
C RM 180
D RM 174

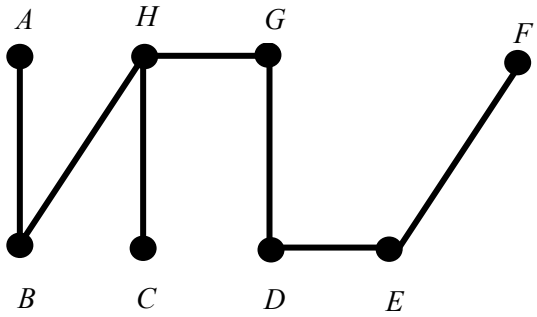
12. Encik Fauzi menerima penyata kad kredit bagi bulan Ogos 2020 dari Bank Bahagia. Penyata menunjukkan baki tertunggak ialah sebanyak RM3 700. Berapakah bayaran minimum yang harus dibayar oleh Encik Fauzi?
Mr Fauzi received a credit card statement for August 2020 *from Bank Bahagia. The statement shows that the outstanding balance is* RM3 700. *What is the minimum payment to be paid by Mr. Fauzi?*

A RM 185
B RM 220.15
C RM 222
D RM 370

13. Diberi $x = 1$ ialah paksi simetri bagi fungsi kuadratik $f(x) = 15 + 2x - x^2$.
Tentukan koordinat titik maksimum bagi fungsi kuadratik ini.
Given that $x = 1$ *is the axis of symmetry of the quadratic function* $f(x) = 15 + 2x - x^2$.
Determine the maximum point coordinates of this quadratic function.

A $(-1, -18)$
B $(-1, -3)$
C $(-1, 12)$
D $(-1, 16)$

14. Rajah 7 di bawah menunjukkan graf mudah.
Diagram 7 *below shows a simple graph*.

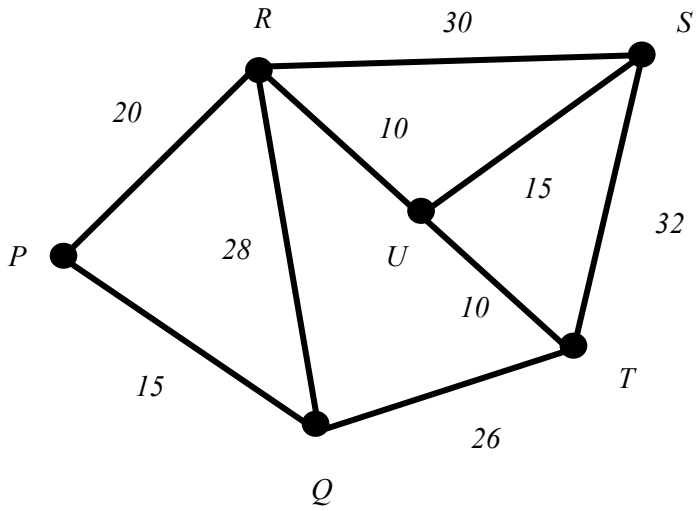


Rajah 7
Diagram 7

Tentukan bilangan bucu dan bilangan tepi bagi graf mudah tersebut.
Determine the number of vertices and the number of edges of the simple graph.

A n(V) = 7, n(E) = 7
B n(V) = 7, n(E) = 8
C n(V) = 8, n(E) = 7
D n(V) = 8, n(E) = 8

15. Rajah 8 di bawah menunjukkan suatu graf tak terarah dan berpemberat.
Diagram 8 *below shows a undirected and weighted graph.*

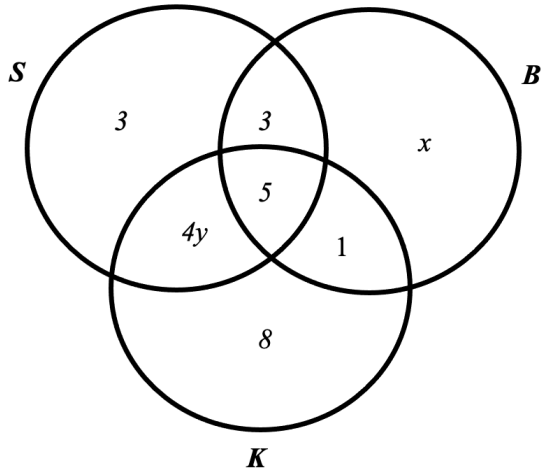


Rajah 8
Diagram 8

Berapakah jumlah nilai pemberat yang minimum bagi satu pokok?
What is the minimum amount of weighting value for one tree?

A 60
B 70
C 91
D 100

16. Gambar rajah Venn yang tidak lengkap di bawah menunjukkan bilangan murid dalam satu kumpulan 56 orang murid yang mengambil bahagian dalam aktiviti Kelab Kitar Semula (S), Persatuan Bahasa Inggeris (B) dan Kadet Remaja Sekolah (K). Diberi bahawa set semesta, $\xi = S \cup B \cup K$ di mana S = {murid yang menyertai Kelab Kitar Semula}, B = {murid yang menyertai Persatuan Bahasa Inggeris} dan K = {murid yang menyertai Kadet Remaja Sekolah}.
The incomplete Venn diagram below shows the number of students in a group of 56 *students who participated in the activities of the Recycling Club (S), English Language Association (B) and School Youth Cadets (K). Given that the universal set,* $\xi = S \cup B \cup K$ *where S = {students who join the Recycling Club}, B = {students who join the English Language Association} and K = {students who join the School Youth Cadets}.*



28 orang murid menyertai dua unit sahaja. Hitung jumlah peserta yang hanya menyertai satu aktiviti sahaja.
28 *students joined two units only. Calculate the number of participants who only participated in only one activity.*

A 5
B 12
C 23
D 33

17. Diberi bahawa:
Given that:

ξ = { x: x ialah integer dan $5 \le x \le 15$ }

ξ = { x: x *is an integer and* $5 \le x \le 15$ }

M = { 7, 8, 9, 11, 12, 13, 14 }

L = { Nombor 2 digit }

L = { *Two digits numbers* }

Senaraikan unsur bagi set $(L \cap M)'$.

Listing the elements of set $(L \cap M)'$.

A {5, 6, 7, 8, 9, 10,15 }
B {5, 6, 7, 8, 9, 10 }
C {5, 6, 7, 8, 9, 15 }
D {5, 6, 7, 8, 10,15 }

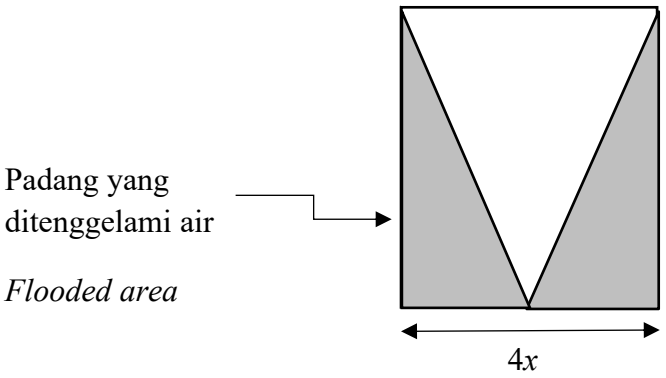
18. Hitung nilai $\sqrt{156.7}$ dengan menggunakan kalkulator dan berikan jawapan anda betul kepada 3 angka perpuluhan.

Calculate the value of $\sqrt{156.7}$ *by using a calculator and give your answer correct to* 3 *decimal places.*

A 12.517
B 12.518
C 12.52
D 12.521

19. Rajah 9 menunjukkan sebuah padang bola sepak yang berbentuk segi empat tepat yang mempunyai keluasan $(16x^2 + 32x)$ meter persegi . Padang itu telah ditenggelami air seperti dalam rajah di bawah. Jika lebar padang itu ialah $4x$ meter dan dua kawasan yang ditenggelami air ialah segi tiga bersudut tegak yang sama saiz, berapakah luas kawasan yang tidak ditenggelami air ?

Diagram 9 *shows a rectangular football field with an area of* $(16x^2 + 32x)$ *square meters. The field has been submerged in water as in the figure below. If the width of the field is* $4x$ *meters and the two flooded areas are right -angled triangles of equal size, what is the area of the non -flooded area*



Rajah 9
Diagram 9

A $8x^2 + 16x \text{ m}^2$
B $8x^2 + 8x \text{ m}^2$
C $4x^2 + 16x \text{ m}^2$
D $8x^2 + 2x \text{ m}^2$

20. Diberi bahawa $2rt - t = \frac{w}{3t}$ ungkapkan t dalam sebuatan r dan w.

Given that $2rt - t = \frac{w}{3t}$, *express t in terms of r and w.*

A $t = \sqrt{\frac{w}{6r-3}}$
B $t = \sqrt{\frac{w}{6r-1}}$
C $t = \sqrt{\frac{3w}{6r-3}}$
D $t = \sqrt{\frac{3w}{6r-1}}$

21. Ringkaskan / *Simplify* $2m^4 \times 10m^6$

A $20\ m^{11}$
B $20\ m^{10}$
C $2\ m^{11}$
D $20\ m^2$

22. Ringkaskan / *Simplify* $\dfrac{(mk^{\frac{1}{3}})^6 \times mk^{-1}}{(m^2k^4)^{\frac{1}{2}}}$

A m^5
B m^6
C $\dfrac{m^5}{k}$
D $\dfrac{m^6}{k}$

23. Ringkaskan / *Simplify* $20\ a^3\ b^5 \div 4\ a\ b^4$

A $5\ a^3\ b$
B $5\ a^2\ b^2$
C $5\ a^2\ b$
D $5\ a\ b^2$

24. Bentukkan persamaan linear dalam satu pemboleh ubah bagi pernyataan berikut:

Construct a linear equation in one variable for the following statement:

Siti membeli lima batang pen dengan harga *y* sen sebatang dan sebuah buku berharga RM5. Jumlah wang yang dibayarnya ialah RM 8 *Siti bought five pens for y cent each and a book for* RM 5. *The amount she paid was* RM 8.

A $5y + 500 = 800$
B $5y + 5 = 8$
C $5y + 800 = 500$
D $5y - 8 = 5$

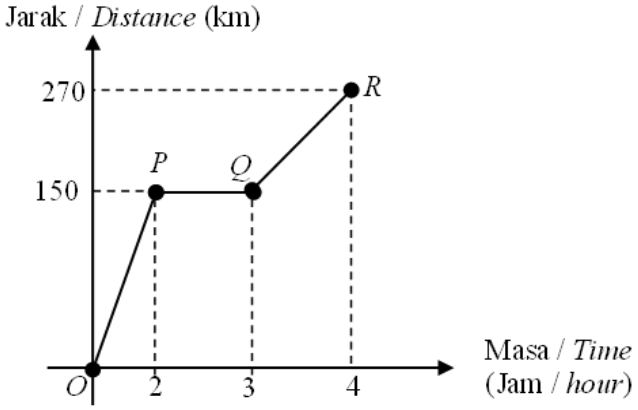
25. Pengurus sebuah gedung pakaian mempunyai beberapa sasaran bagi pekerja jualannya.
The manager of a clothing store has several targets for his sales employees.

Pada bulan Mac jumlah masa, t yang digunakan untuk mengira inventori Gedung selebih-lebihnya 6 jam. *In March the total time, t used to calculate the store inventory was a maximum of* 6 *hours.* Jumlah jualan minimum sebulan dalam RM, x , ialah 19 000. *The minimum sales volume per month in* RM*, x, is* 19 000*.*

Bina satu ketaksamaan linear berdasarkan situasi tersebut.
Construct a linear inequality based on the situation.

A $t \leq 6$, $x \geq 19\,000$
B $t \geq 6$, $x \leq 19\,000$
C $t > 6$, $x < 19\,000$
D $t > 6$, $x > 19\,000$

26. Rajah 10 menunjukkan graf jarak-masa perjalanan Habib sejauh 270 km.
Diagram 10 *shows the distance-time graph Habib for a distance of* 270 km.



Rajah 10
Diagram 10

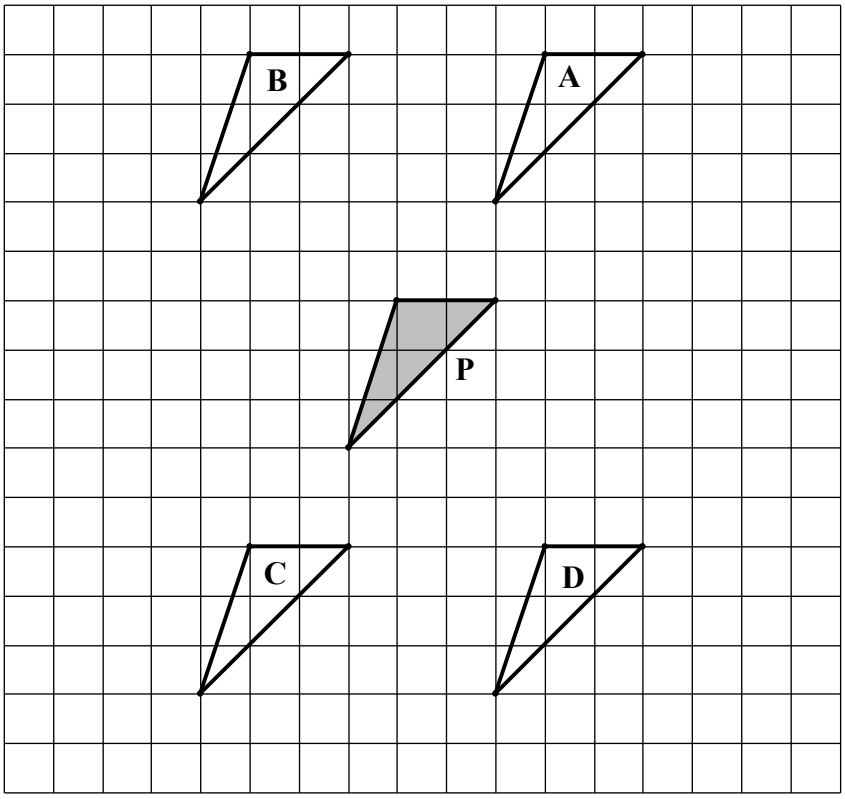
Tentukan tempoh masa dalam keadaan pegun dan laju perjalanan dalam tempoh 2 jam yang pertama.
Determine the period of time at rest and the speed of travel in the first 2 *hours.*

A 2 jam , 75 kmj^{-1} / 2 *hour , 75 kmh*$^{-1}$
B 1 jam , 75 kmj^{-1} / 1 *hour , 75 kmh*$^{-1}$
C 2 jam , 150 kmj^{-1} / 2 *hour , 150 kmh*$^{-1}$
D 1 jam , 150 kmj^{-1} / 1 *hour , 150 kmh*$^{-1}$

27. Tentukan pintasan - *x* dalam suatu garis lurus yang melalui titik *Q* (0 , - 6) dengan kecerunan -2.
Determine the x - intercept of a straight line passing through the point Q (0, - 6) *with a gradient* -2.

A - 3
B - 2
C 3
D 4

28. Antara yang berikut, manakah imej bagi sisi tiga P dibawah satu translasi $\binom{-3}{5}$?
Which of the following is the image of triangle P *under a translation* $\binom{-3}{5}$?

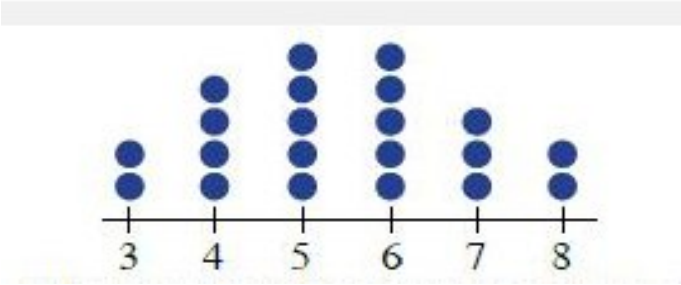


29. Tentukan median bagi set data berikut.
Determine the median for the following data set.

2, 3, 5, 4, 6, 8, 9, 1, 2

A 2
B 3
C 4
D 6

30. Satu tinjauan telah dijalankan ke atas 21 orang pelajar dari Universiti Putra Malaysia tentang purata jam ulangkaji yang digunakan dalam sehari semasa minggu peperiksaan. Berikut adalah plot titik yang mewakili data tersebut.
A survey was conducted on 21 *students from Universiti Putra Malaysia about the average hours of revision used in a day during the examination week. Here is a plot of points representing the data.*



Masa (jam) / *Time (hours)*

Hitung beza purata jam bagi tempoh masa terpanjang dan tempoh masa terpendek.
Calculate the difference of the average hours for the longest time period and the shortest time period

A 2
B 3
C 4
D 5

31. Jadual 1 di bawah menunjukkan bilangan ketidakhadiran 20 orang murid pada bulan September tahun 2021. Hitung varians bagi bilangan hari murid tidak hadir.
Table 1 *below shows the number of absentees of* 20 *students in the September of* 2021. *Calculate the variance for the number of days students were absent.*

Bilangan hari/ *Number of day*	1	2	3	4	5
Bilangan murid/ *Number of students*	3	5	8	2	2

Jadual 1/ *Table* 1

A 2.75
B 1.13
C 1.29
D 1.75

32. Antara berikut yang manakah bukan satu kompenan penting dalam matlamat kewangan SMART?
Which of the following is not a key component in the SMART financial goals?

A Bersifat realistic
Realistic
B Belanjawan yang ketat
Tight budget
C Boleh di capai
Attainable
D Boleh diukur
Measurable

33. Encik Hadif menerima pendapatan aktif sebanyak RM4 000, dan pendapatan pasif sebanyak RM1 000 dalam sebulan. Encik Hadif juga mempunyai perbelanjaan tetap sebanyak RM1850 dan perbelanjaan tidak tetap sebanyak RM750 sebulan. Hitung aliran tunai bulanan Encik Hadif.
Mr. Hadif receives an active income of RM4 000*, and a passive income of* RM1 000 *in a month. Mr. Hadif also has a fixed expense of* RM1 850 *and a non -fixed expense of* RM750 *per month. Calculate Mr. Hadif's monthly cash flow.*

A RM 2400
B – RM 2400
C RM 400
D – RM 400

34. Jadual 2 menunjukkan kadar premium tahunan per RM1 000 nilai muka insurans hayat boleh baharu yang ditawarkan oleh sebuah syarikat insurans.
Table 2 *shows the annual premium rate per* RM1 000 *face value of renewable life insurance offered by an insurance company.*

Umur *Age*	Lelaki / *Male* (RM)		Perempuan / *Female* (RM)	
	Bukan perokok *Non smoker*	Perokok *Smoker*	Bukan perokok *Non smoker*	Perokok *smoker*
27	2.13	2.72	1.18	1.40
28	2.13	2.73	1.19	1.42
29	2.13	2.75	1.21	1.44
30	2.13	2.79	1.23	1.46

Jadual 2/ *Table 2*

Dengan nilai muka sebanyak RM140 000. Hitung premium tahunan bagi seorang lelaki berumur 28 tahun yang tidak merokok.
Based on the face value of RM140 000*. Calculate the annual premium for a* 28 *year old man who does not smoke.*

A RM 166.60
B RM 198.80
C RM 298.20
D RM 382.20

35. Puan Lisa memiliki sebuah rumah banglo yang mempunyai nilai boleh insurans sebanyak RM 500000. Rumah tersebut diinsuranskan dengan insurans kebakaran yang memperuntukkan ko-insurans 70% daripada nilai boleh insurans. Jika rumah Puan Lisa hangus terbakar, berapakah nilai pampasan yang akan diterima oleh Puan Lisa?
Mrs Lisa has a bungalow house with an insurable value of more than RM 500000*.The house is insured using a fire insurance that allocates co-users* 70% *of the insurable value. If Mrs Lisa's house burns down, how much compensation will Mrs Lisa receive?*

A RM 150 000
B RM 200 000
C RM 350 000
D RM 500 000

36. Sebiji guli diambil dari sebuah bekas yang mengandungi 30 biji guli merah dan 20 biji guli biru.Hitung kebarangkalian guli berwarna merah diambil.
A marble is taken from a container containing 30 *red marbles and* 20 *blue marbles. Calculate the probability that red marbles are taken.*

A $\frac{1}{2}$

B $\frac{3}{5}$

C $\frac{2}{3}$

D $\frac{2}{5}$

37. Alicia memiliki sebidang tanah berkeluasan 7.0 m × 22.3 m untuk membina rumah kediaman. Kerajaan negeri menetapkan kadar cukai tanah di kawasan itu pada R0.50 setiap meter persegi. Hitung jumlah cukai tanah yang perlu dibayar oleh Alicia setiap tahun.
Alicia owns a plot of land measuring 7.0 m × 22.3 m *to build a residential house. The state government sets the land tax rate in the area at* RM0.50 *per square meter. Calculate the amount of land tax that Alicia has to pay each year.*

A RM 78.05
B RM 1873.20
C RM 312.20
D RM 156.10

38. Diberi bahawa $p \propto q^2$r, ungkapkan p dalam sebutan q dan r jika $p = 15$ apabila $q = 5$ dan $r = 3$.
Given that $p \propto q^2$r *, express p in terms of q and r if* $p = 15$ *when* $q = 5$ *and* $r = 3$

A $p = \frac{1}{5}qr^2$

B $p = 5q^2$r

C $p = q^2$r

D $p = \frac{1}{5}q^2$r

39. Diberi bahawa *s* berubah secara langsung dengan punca kuasa dua *t* dan secara songsang dengan *u*. Jika *s* = 8 apabila *t* = 36 dan *u* = 3, ungkapkan *s* dalam sebutan *t* dan *u*.
Given that s varies directly with the square root of t and inversely with u. If s = 8 *when t* = 36 *and u* = 3*, express s in terms of t and u.*

A $s = \frac{4\sqrt{t}}{u}$

B $s = 4\sqrt{tu}$

C $s = \frac{2\sqrt{t}}{u}$

D $s = 6\sqrt{tu}$

40. Diberi bahawa $3Q + \begin{bmatrix} 2 & 4 \\ 6 & -3 \end{bmatrix} = \begin{bmatrix} 8 & 10 \\ 6 & 12 \end{bmatrix}$
It is given that $3Q + \begin{bmatrix} 2 & 4 \\ 6 & -3 \end{bmatrix} = \begin{bmatrix} 8 & 10 \\ 6 & 12 \end{bmatrix}$
Cari matriks *Q*.
Find of matrix Q.

A $\begin{bmatrix} 6 & 6 \\ 0 & 9 \end{bmatrix}$

B $\begin{bmatrix} 2 & 2 \\ 0 & 5 \end{bmatrix}$

C $\begin{bmatrix} 6 & 6 \\ 0 & 15 \end{bmatrix}$

D $\begin{bmatrix} 10 & 14 \\ 12 & 9 \end{bmatrix}$

KERTAS SOALAN TAMAT
END OF QUESTION PAPER

1449/1
Matematik
Kertas
Oktober 2021
$1\frac{1}{2}$ jam

KEMENTERIAN PENDIDIKAN MALAYSIA
PEJABAT PENDIDIKAN DAERAH PASIR GUDANG

MODUL PEPERIKSAAN PERCUBAAN SPM 2021

SET 1

MATEMATIK

Kertas 1

Satu jam tiga puluh minit

PERATURAN PEMARKAHAN SET 1

PEPERIKSAAN PERCUBAAN SPM 2021

PEPERIKSAAN PERCUBAAN SPM 2021

`

SET 1

MATEMATIK 1449/1

JAWAPAN

No. Soalan	Jawapan	No. Soalan	Jawapan	No. Soalan	Jawapan	No. Soalan	Jawapan
1	A	**11**	D	**21**	B	**31**	C
2	D	**12**	A	**22**	D	**32**	B
3	D	**13**	D	**23**	C	**33**	A
4	C	**14**	C	**24**	A	**34**	C
5	C	**15**	B	**25**	A	**35**	C
6	A	**16**	C	**26**	B	**36**	B
7	B	**17**	A	**27**	A	**37**	A
8	D	**18**	B	**28**	B	**38**	D
9	B	**19**	A	**29**	C	**39**	A
10	A	**20**	A	**30**	D	**40**	B

Matematik
Kertas 2
Oktober 2021
2 ½ jam

NAMA :

TINGKATAN :

KEMENTERIAN PENDIDIKAN MALAYSIA
PEJABAT PENDIDIKAN DAERAH PASIR GUDANG

MODUL PEPERIKSAAN PERCUBAAN SPM
2021
SET 1

MATEMATIK
Kertas 2
Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Modul ini mengandungi tiga bahagian :* **Bahagian A, Bahagian B** *dan* **Bahagian C**. *Jawab* **semua** *soalan daripada* **Bahagian A, Bahagian B** *dan* **satu** *soalan dalam* **Bahagian C.**

2. *Jawapan hendaklah ditulis dengan jelas dalam ruang yang disediakan dalam modul. Tunjukkan langkah-langkah penting. Ini boleh membantu anda untuk mendapatkan markah.*

3. *Rajah yang mengiringi modul tidak dilukis mengikut skala kecuali dinyatakan.*

4. *Satu senarai rumus disediakan di halaman 2 & 3.*
5. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.*

Pemeriksa			
Bahagian	**Soalan**	**Markah Penuh**	**Markah Diperoleh**
A (40m)	**1**	**3**	
	2	**4**	
	3	**4**	
	4	**5**	
	5	**4**	
	6	**3**	
	7	**4**	
	8	**4**	
	9	**4**	
	10	**5**	
B (45m)	**11**	**8**	
	12	**9**	
	13	**9**	
	14	**9**	
	15	**10**	
C (15m)	**16**	**15**	
	17	**15**	
Jumlah (100m)			

Modul ini mengandungi 30 halaman bercetak

RUMUS MATEMATIK

MATHEMATICAL FORMULAE

Rumus-rumus berikut boleh membantu anda untuk menjawab soalan. Simbol-simbol yang diberi adalah yang biasa digunakan.

The following formulae may be helpful in answering the questions. The symbols given are the ones commonly used

PERKAITAN

RELATIONS

1 $a^m \times a^n = a^{m+n}$

2 $a^m \div a^n = a^{m-n}$

3 $(a^m)^n = a^{mn}$

4 $A^{-1} = \frac{1}{ad-bc}\begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$

5 Jarak / *Distance* = $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

6 Titik Tengah / *midpoint*

$(x, y) = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

7 Purata laju = $\frac{\text{jarak yang dilalui}}{\text{masa yang diambil}}$

Average speed = $\frac{\textit{distance travelled}}{\textit{time taken}}$

8 Min = $\frac{\text{hasil tambah nilai data}}{\text{bilangan data}}$

Mean = $\frac{\textit{sum of data}}{\textit{number of data}}$

9 Min = $\frac{\text{hasil tambah (nilai titik tengah kelas} \times \text{kekerapan)}}{\text{hasil tambah kekerapan}}$

$Mean = \frac{\textit{sum of (midpoint} \times \textit{frequency)}}{\textit{sum of frequencies}}$

10 Varians / *Variance*, $\sigma^2 = \frac{\Sigma(x-\bar{x})^2}{N} = \frac{\Sigma x^2}{N} - \bar{x}^2$

11 Varians / *Variance*, $\sigma^2 = \frac{\Sigma f(x-\bar{x})^2}{\Sigma f} = \frac{\Sigma f x^2}{\Sigma f} - \bar{x}^2$

12 Sisihan piawai / *Standard deviation*, $\sigma = \sqrt{\frac{\Sigma(x-\bar{x})^2}{N}} = \sqrt{\frac{\Sigma x^2}{N} - \bar{x}^2}$

13 Sisihan piawai / *Standard deviation*, $\sigma = \sqrt{\frac{\Sigma f(x-\bar{x})^2}{\Sigma f}} = \sqrt{\frac{\Sigma f x^2}{\Sigma f} - \bar{x}^2}$

14 TeoremPithagoras/*Pythagoras Theorem*

$c^2 = a^2 + b^2$

15 $P(A) = \frac{n(A)}{n(S)}$

16 $P(A') = 1 - P(A)$

17 $m = \frac{y_2-y_1}{x_2-x_1}$

18 $m = -\frac{\text{pintasan-}y}{\text{pintasan-}x}$

$m = -\frac{y\text{-intercept}}{x\text{-intercept}}$

19 Faedah mudah / Simple interest, $I = Prt$

20 Nilai matang / *Maturity value*

$MV = P\left(1+\frac{r}{n}\right)^{nt}$

21 Jumlah bayaran balik / *Total amount payable*

$A = P + \text{Prt}$

BENTUK DAN RUANG
SHAPES AND SPACE

1 Luas trapezium = $\frac{1}{2}$×hasil tambah dua sisi selari×tinggi

Area of trapezium = $\frac{1}{2} \times$ *sum of parallel sides* $\times$ *height*

2 Lilitan bulatan = $\pi d = 2\pi j$
Circumference of circle = $\pi d = 2\pi r$

3 Luas bulatan = πj^2
Area of circle = πr^2

4 Luas permukaan melengkung silinder = $2\pi jt$
Curved surface area of cylinder = $2\pi rh$

5 Luas permukaan sfera = $4\pi j^2$
Surface area of sphere = $4\pi r^2$

6 Isipadu prisma tegak = Luas keratan rentas×panjang
Volume of right prism = cross sectional area×length

7 Isipadu silinder = $\pi j^2 t$
Volume of cylinder = $\pi r^2 h$

8 Isipadu kon = $\frac{1}{3}\pi j^2 t$

Volume of cone = $\frac{1}{3}\pi r^2 h$

9 Isipadu sfera = $\frac{4}{3}\pi j^3$

Volume of sphere = $\frac{4}{3}\pi r^3$

10 Isipadu piramid tegak = $\frac{1}{3} \times$ luas tapak $\times$ tinggi

Volume of right pyramid = $\frac{1}{3} \times$ *base area* $\times$ *height*

11 Hasil tambah sudut pedalaman poligon = $(n-2) \times 180^o$
Sum of interior angles of a polygon = $(n-2) \times 180^o$

12 $$\frac{\text{panjang lengkok}}{\text{lilitan bulatan}} = \frac{\text{sudut pusat}}{360^o}$$

$$\frac{\textit{arc length}}{\textit{circumference of circle}} = \frac{\textit{angle subtended at centre}}{360^\circ}$$

13 $$\frac{\text{luas sektor}}{\text{luas bulatan}} = \frac{\text{sudut pusat}}{360^o}$$

$$\frac{\textit{area of sector}}{\textit{area of circle}} = \frac{\textit{angle subtended at centre}}{360^\circ}$$

14 Faktor skala, $k = \frac{PA'}{PA}$

Scale factor, $k = \frac{PA'}{PA}$

15 Luas imej = k^2×luas objek
Area of image = k^2×*area of object*

Bahagian A

Section A

[40 markah]

[40marks]

Jawab **semua** soalan dalam bahagian ini.

Answer all questions in this section

1 *(a)* Gambar rajah Venn di ruangan jawapan menunjukkan set A dan B dengan keadaan set semesta, Ɛ= A U B.

Pada rajah di ruangan jawapan, lorek set A ∩ B

The Venn diagram in the answer space shows sets A and B such that the universal set, Ɛ= A U B.

On the diagram in the answer space, shade the set A ∩ B

(b) Diberi bahawa set P = {nombor kuasa dua sempurna}dan set Q = {9, 16, 25}.

Lengkapkan gambarajah venn di ruang jawapan untuk menunjukkan hubungan antara set P dan set Q

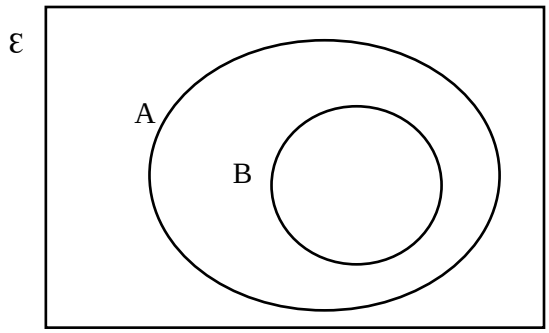
It is given that set P = {perfect square numbers} and Q = {9, 16, 25}.

Complete the Venn diagram in the answer space to show the relationship between set P and set Q.

[3 markah / 3 *marks*]

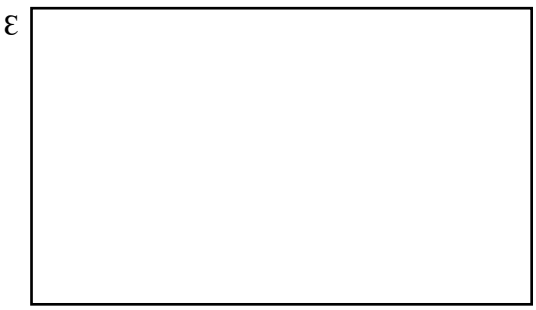
Jawapan / *Answer:*

(a)



Rajah 1(a) / *Diagram 1(a)*

(b)



Rajah 1(b) / *Diagram 1(b)*

2 Panjang sebuah penanda buku ialah (x + 1) cm seperti Rajah 2. Jika lebarnya ialah 5 cm kurang daripada panjangnya dan luas penanda buku ialah 24 cm^2, hitung perimeter penanda buku tersebut.

The length of a book marker is (x + 1) cm as shown in diagram 2. If the width is 5 cm less than its length and the area of the book marker is 24 cm^2, calculate the perimeter of the book marker.

(x + 1) cm

Rajah 2 / *Diagram 2*

[4markah / *4marks*]

Jawapan / *Answer:*

3 Penyelesaian dengan **kaedah matriks tidak dibenarkan** untuk menjawab soalan ini.
*Solution by **matrix method is not allowed** to answer this question.*

Cari nilai m dan n yang memuaskan persamaan linear serentak berikut:
Find the value of m and n that satisfy the following simultaneous linear equations.

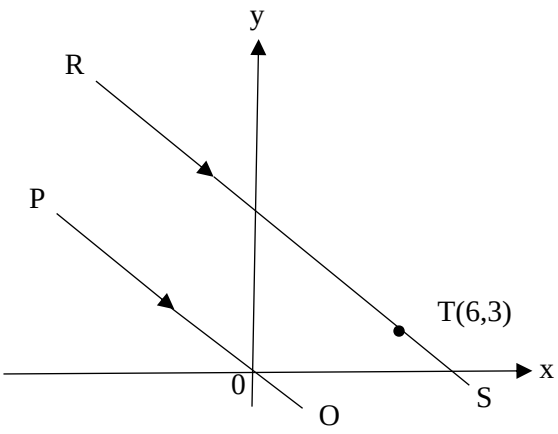
$$m + 4n = 14$$
$$3m + 2n = 12$$

[4 markah / 4 *marks*]

Jawapan / *Answer*

4 Dalam Rajah 4, garis lurus PO adalah selari dengan garis lurus RS. Persamaan garis lurus PO ialah $2y = -x$

In Diagram 4, straight line PO is parallel to straight line RS. The equation of straight line PO is $2y = -x$



Rajah 4 / *Diagram 4*

(a) Cari persamaan bagi garis lurus RS.
Find the equation of the straight line RS.

(b) Cari pintasan-x bagi garis lurus RS.
Find the x-intercept of the straight line RS.

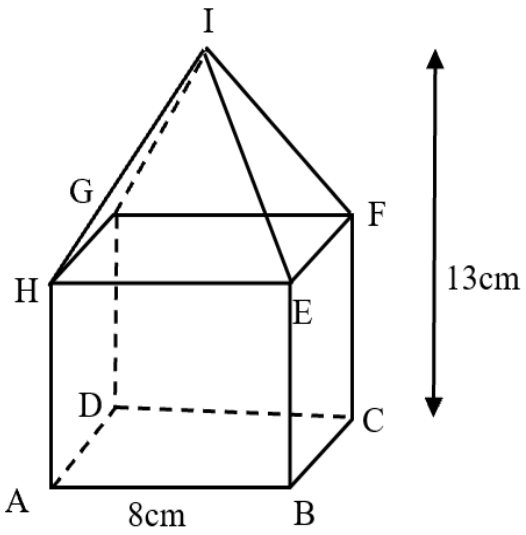
[5 markah / 5 *marks*]

Jawapan / *Answer:*

(a)

(b)

5 Rajah 5 menunjukkan sebuah gabungan pepejal yang dibentuk daripada cantuman sebuah kubus dan sebuah piramid tegak pada satah segiempat sama EFGH.
Diagram 5 shows a composite solid formed by the combination of a cube and a right pyramid at the square plane EFGH.



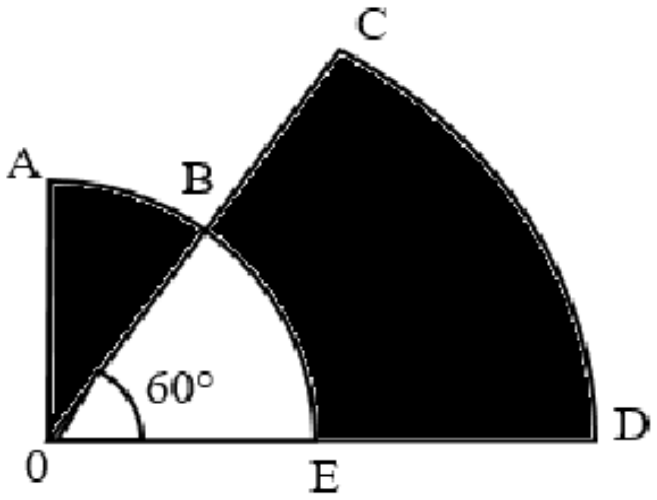
Rajah 5 / *Diagram 5*

Diberi bahawa AB = BC = BE = 8 cm dan tinggi gabungan dua pepejal itu ialah 13 cm. Hitung isipadu, dalam cm^3, gabungan pepejal itu.
It is given that AB = BC = BE = 8 cm and the height of the combine solid is 13 cm. Calculate the volume, in cm^3, of the composite solid.

[4 markah / 4 *marks*]

Jawapan / *Answer:*

6 Dalam Rajah 6, OABE ialah sukuan bulatan berpusat O dan CD ialah lengkok suatu bulatan lain, juga berpusat O.
OBC dan OED ialah garis lurus. OE = ED = 7cm dan < COD = 60°.
In diagram 6*, OABE is a quadrant of a circle with centre O and CD is an arc of another circle with centre O.*
OBC and OED are straight lines. OE = ED = 7cm and < COD = 60°.



Rajah 6 / *Diagram 6*

Dengan menggunakan $\pi = \frac{22}{7}$, hitungkan luas dalam cm^2, kawasan yang berlorek.
Using $\pi = \frac{22}{7}$*, calculate the area, in* cm^2*, of the shaded region.*

[3markah / 3 *marks*]

Jawapan / *Answer* :

7 Encik Kamarul dan Encik Farhan pergi ke pasar untuk membeli udang dan sotong. Jadual 7 di bawah menunjukkan berat udang dan sotong yang dibeli oleh mereka.
Encik Kamarul and Encik Farhan went to the market to buy shrimp and squid. The table 7 below shows the weight of shrimp and squid purchased by them.

	Udang / *Shrimp*	Sotong / *Squid*
Encik Kamarul	2 kg	4 kg
Encik Farhan	3 kg	5 kg

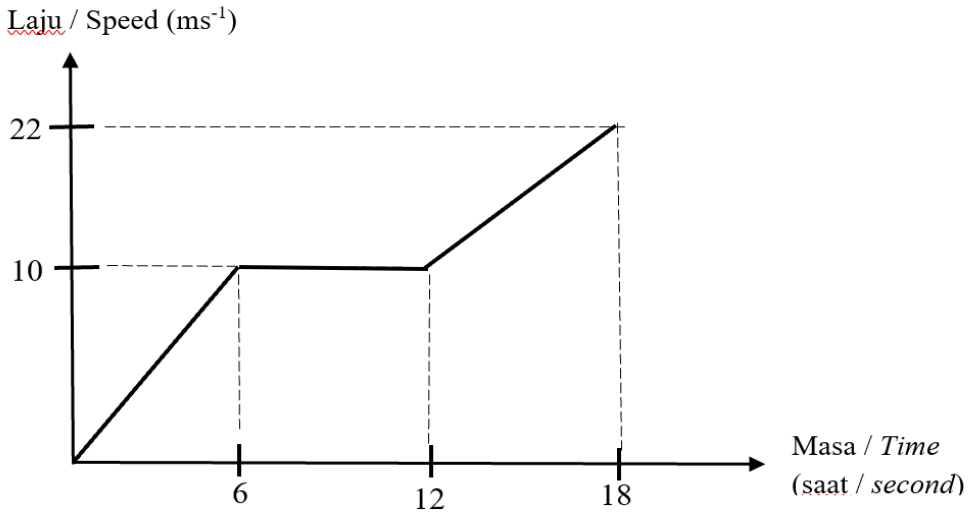
Jadual 7 / *Table 7*

Encik Kamarul dan Encik Farhan masing-masing membayar RM26 dan RM35 untuk pembelian udang dan sotong. Hitung harga bagi sekilogram udang dan sekilogram sotong dengan **menggunakan kaedah matriks.**
Encik Kamarul and Encik Farhan paid RM26 and RM35 respectively for the purchase of shrimp and squid. Calculate the price per kilogram of shrimp and per kilogram of squid ***using the matrix method.***

[4 markah / 4 *marks*]

Jawapan / *Answer*:

8 Graf laju masa dalam Rajah 8 menunjukkan kelajuan sebuah zarah.
The time speed graph in Diagram 8 shows the speed of a particles.



Rajah 8 / *Diagram 8*

(a) Hitung laju purata, dalam ms^{-1}, zarah dalam tempoh 18 saat.
Calculate the average speed, in ms^{-1}, of a particles in 18 seconds.

(b) Huraikan Gerakan zarah bagi tempoh 6 saat yang kedua.
Describe the motion of the particles for the next 6 seconds.

[4 markah / 4 *marks*]

Jawapan / *Answer*:

(a)

(b)

9 *(a)* Bina satu implikasi yang sesuai untuk pasangan implikasi yang berikut:
Construct an appropriate implication for the following pair of implications:

Jika 20% daripada 30 ialah 6 maka $0.2 \times 30 = 60$ Jika $0.2 \times 30 = 60$ maka 20% daripada 30 ialah 6 *If 20% of 30 is 6 then $0.2 \times 30 = 60$* *If $0.2 \times 30 = 60$ then 20% of 30 is 6*

(b) (i) Tulis premis 2 bagi hujah deduktif berikut:
Write premise 2 for the following deductive argument:

Premis 1	: Semua gandaan 3 ialah nombor ganjil.
Premise 1	*: All multiples of 3 are odd numbers.*
Premis / *Premise 2*	: ……..
Kesimpulan	: 15 ialah nombor ganjil.
Conclusion	*: 15 is an odd number.*

(ii) Tentukan sama ada hujah deduktif tersebut b(i) adalah sah dan munasabah atau tidak.
Determine whether the deductive argument b (i) is valid and reasonable or not.

[4 markah / 4 *marks*]

Jawapan / *Answer:*

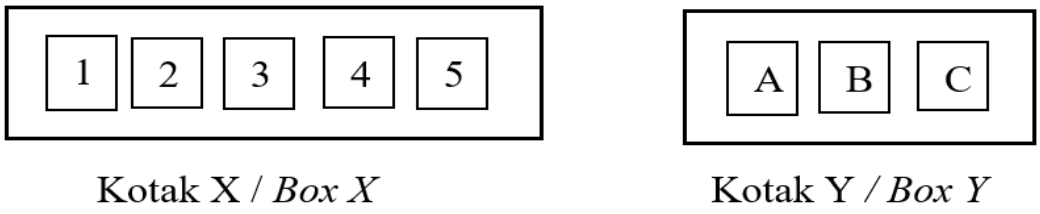
(a) ……

(b)(i) Premis 2 / *Premise 2* : ……

(ii) ……..

10 Cikgu Fikri mengajar tajuk kebarangkalian di kelas 4 Chempaka. Dia menyediakan 2 kotak seperti dalam rajah 10. Kotak X mengandungi kad-kad yang berlabel nombor dan kotak Y mengandungi kad-kad yang berlabel abjad. Seorang pelajar diminta untuk mengambil dua kad secara rawak, satu kad dari kotak X dan kemudian satu kad dari kotak Y.

Cikgu Fikri teaches the topic of probability in class 4 Chempaka. He provides 2 boxes as in figure 10. Box X contains cards labelled with numbers and box Y contains cards labelled with letters. A student is asked to take two cards randomly, one card from box X and then one card from box Y



Kotak X / *Box X* Kotak Y / *Box Y*

Rajah 10 / *Diagram 10*

(a) Lengkapkan ruang sampel di Jadual 10 di ruangan jawapan.
Complete the sample space in table 10 in the answer space.

(b) Dengan menyenaraikan semua kesudahan yang mungkin bagi peristiwa itu, cari kebarangkalian bahawa
By listing down all the possible outcomes of the event, find the probability that

(i) satu kad berlabel nombor yang kurang daripada empat dan satu kad berlabel huruf konsonan dipilih.
one card labelled a number less than four and one card labeled a consonant letter are selected.

(ii) satu kad nombor lebih daripada tiga atau satu kad huruf vokal dipilih.
one card labelled a number greater than three or one card labeled a vocal letter are selected.

[5 markah / *5 marks*]

Jawapan / *Answer* :

(a)

	A	B	C
1	(1,A)		
2		(2,B)	
3			(3,C)
4		(4,B)	
5	(5,A)		

Jadual 10 / *Table 10*

(b)(i)

(ii)

Bahagian B

Section B

[45 markah]

[45 marks]

Jawab **semua** soalan dalam bahagian ini.

Answer all questions in this section

11 *(a)* Lengkapkan Jadual 11 di ruang jawapan bagi persamaan $y = \frac{8}{x}$ dengan menulis nilai-nilai *y* apabila *x* = -1 dan *x* = 3.

Complete Table 11 in the answer space for the equation $y = \frac{8}{x}$ *by writing down the values of y when x = -1 and x = 3.*

[2 *markah /2 marks*]

(b) Untuk ceraian soalan ini, gunakan kertas graf yang disediakan. Anda boleh menggunakan pembaris fleksibel.

Menggunakan skala 2 cm kepada 1 unit pada paksi-*x* dan 2 cm kepada 2 unit pada paksi-*y*, lukis graf $y = \frac{8}{x}$ untuk $-4 \leq x \leq 4$.

For this part of question, use the graph paper provided. You may use a flexible curve rule. Using a scale of 2 cm to 1 unit on x-axis and 2 cm to 2 units on the y-axis, draw the graph of $y = \frac{8}{x}$ *for* $-4 \leq x \leq 4$.

[4 *markah /4 marks*]

(c) Daripada graf di 11 (b), cari

From the graph in 11 (b), find

(i) nilai *x* apabila $y = -5$,
the value of x when $y = -5$.

(ii) nilai *y* apabila $x = 2.5$.
the value of y when $x = 2.5$.

[2 markah/2 *marks*]

Jawapan / *Answer* :

(a) $y = \frac{8}{x}$

x	-4	-3	-2	-1	1	2	3	4
y	-2	-2.7	-4		8	4		2

Jadual 11/ *Table* 11

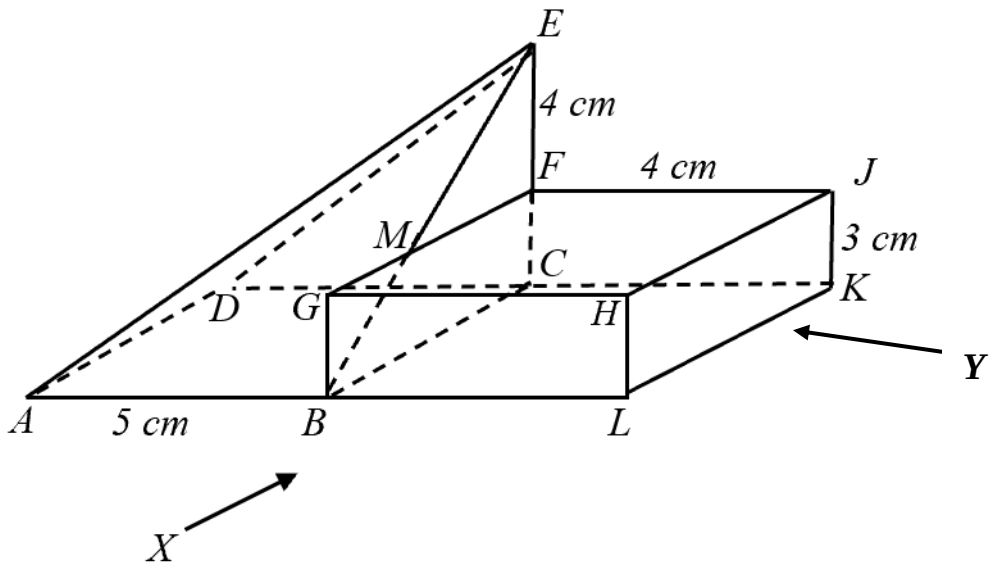
(b) Rujuk kertas graf.
Refer the graph paper.

(c) (i) *y* = ……

(ii) *x* = ……

12 Sebuah pepejal berbentuk kuboid dengan tapak segi empat sama *BLKC* dicantumkan kepada piramid seperti dalam Rajah 12 pada satah mencancang *BCFM*. Tapak *ABLKCD* terletak di atas satah mengufuk.

A solid cuboid with square base BLKC is joined to the pyramid as shown in Diagram 12 at the vertical plane BCFM. The base ABLKCD lies on a horizontal plane.



Rajah 12

Diagram 12

Lukis dengan skala penuh,

Draw to full scale,

(a) dongakan gabungan pepejal itu pada satah mencancang yang selari dengan *ABL* sebagaimana dilihat dari *X*.

The elevation of the composite solid on a vertical plane parallel to ABL as viewed from X.

[4 markah/ *4 marks*]

(b) dongakan gabungan pepejal itu pada satah mencancang yang selari dengan *LK* sebagaimana dilihat dari *Y*.

The elevation of the composite solid on a vertical plane parallel to LK as viewed from Y.

[5 markah/5 *marks*]

Jawapan / *Answer* :

(*a*),(*b*)

13 *(a)* Rose merancang untuk membeli sebuah kereta berharga RM65 000. Dia merancang untuk membayar 10% wang pendahuluan secara tunai. Rose bercadang menyimpan wang pendahuluan itu dalam masa 8 bulan. Berapakah simpanan bulanan yang harus disimpan oleh Rose untk mencapai matlamatnya ?

Rose plans to buy a car that costs RM65 000. She plans to pay a 10% down payment in cash. Rose plans to save for the down payment in 8 months. How much monthly savings does Rose need to make in order to achive her goal ?

[2 markah/2 *marks*]

(b) Seon Ho adalah seorang pengaturcara komputer di Syarikat *xYz* dengan gaji bersih bulanan RM7 500. Beliau juga mempunyai kerja sambilan sebagai guru komputer. Gaji sebagai guru komputer adalah RM500 sebulan. Di samping itu, beliau memperolehi hasil sewa rumah keduanya sebanyak RM800 sebulan. Anggaran perbelanjaaan bulanannya adalah seperti berikut.

Seon Ho is a computer programmer in Company xYz with a monthly net salary RM7 500. He also has a part time job as a computer teacher. The salary as a computer teacher is RM500 a month. In addition, he earns rent for his second house of RM800 a month. The estimated monthly expenses are as follows.

Perbelanjaan bulanan/*Monthly Expenses*	**RM**
Bayaran ansuran pinjaman rumah pertama *House (1) monthly installment*	970
Bayaran ansuran pinjaman rumah kedua *House (2) monthly installment*	890
Bayaran ansuran kereta *Car monthly installment*	1300
Perbelanjaan makanan *Food expenditure*	950
Utiliti rumah *House utilities*	450
Premium insurans *Insurance premium*	540
Percutian & pelancongan *Holidays & Vacation*	800
Bayaran tol dan petrol *Toll and petrol*	300
Elaun ibu bapa bulanan *Monthly parents' allowance*	1200
Simpanan tetap bulanan *Monthly fixed saving*	750

(i) Sediakan satu pelan kewangan peribadi bulanan untuk Seon Ho.
Prepare a personal monthly financial plan for Seon Ho.

[5 *markah*/5 *marks*]

(ii) Kemukakan komen tentang lebihan atau kurangan yang dialami oleh Seon Ho berdasarkan pelan kewangan ini.
Comment on the surplus or deficit experienced by Seon Ho based on this financial plan.
[2 markah/2 *marks*]

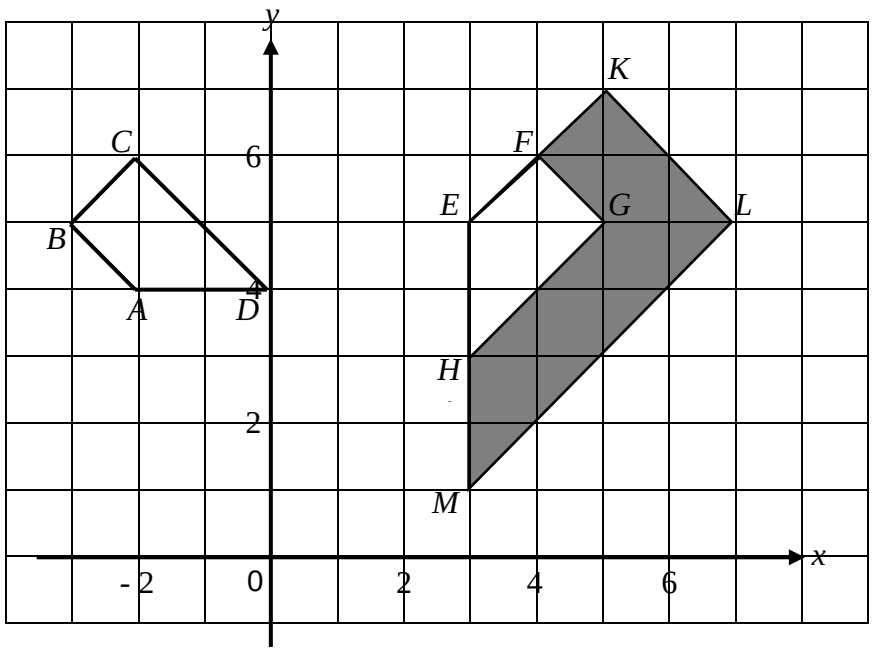
Jawapan / *Answer* :
(a)

(b) (i)

Butiran/*Details*	**(RM)**	
Gaji bersih/*nett salary*		
Jumlah pendapatan bulanan/ *Total Monthly income*		
Simpanan tetap bulanan/ *monthly fixed deposits*		
Baki pendapatan/ *Income Balance*		
Tolak perbelanjaan tetap bulanan/ *Minus fixes expenses*		
Jumlah perbelanjaan tetap bulanan/*total monthly fixed expenses*		
Tolak jumlah perbelanjaan tidak tetap bulanan/ **Minus the total monthly fixed expenses**		
Jumlah perbelanjaan tidak tetap bulanan/ *The amount of monthly non-fixed*		
Pendapatan lebihan/ Kurangan **Surplus/ Deficit income**		

(ii)

14 Rajah di bawah menunjukkan trapezium ABCD, EFGH dan EKLM yang dilukis pada satah Cartes.
The diagram below shows trapeziums ABCD, EFGH and EKLM drawn on a Cartesian plane.



(a) *EKLM* ialah imej bagi *ABCD* di bawah gabungan transformasi **PQ**. Huraikan selengkapnya, transformasi **Q** dan transformasi **P**.

EKLM is the image of ABCD under the combined transformation **PQ**. *Describe in full, the transformation* **Q** *and the transformation* **P**.

[6 markah/6 *marks*]

(b) Diberi luas kawasan berlorek ialah 54 unit^2, hitung luas, dalam unit^2, *EFGH*.
Given that the area of the shaded region is 54 *unit*^{2}, *calculate the area, unit*^{2}, *of EFGH.*

[3 markah/ *marks*]

Jawapan / *Answer* :

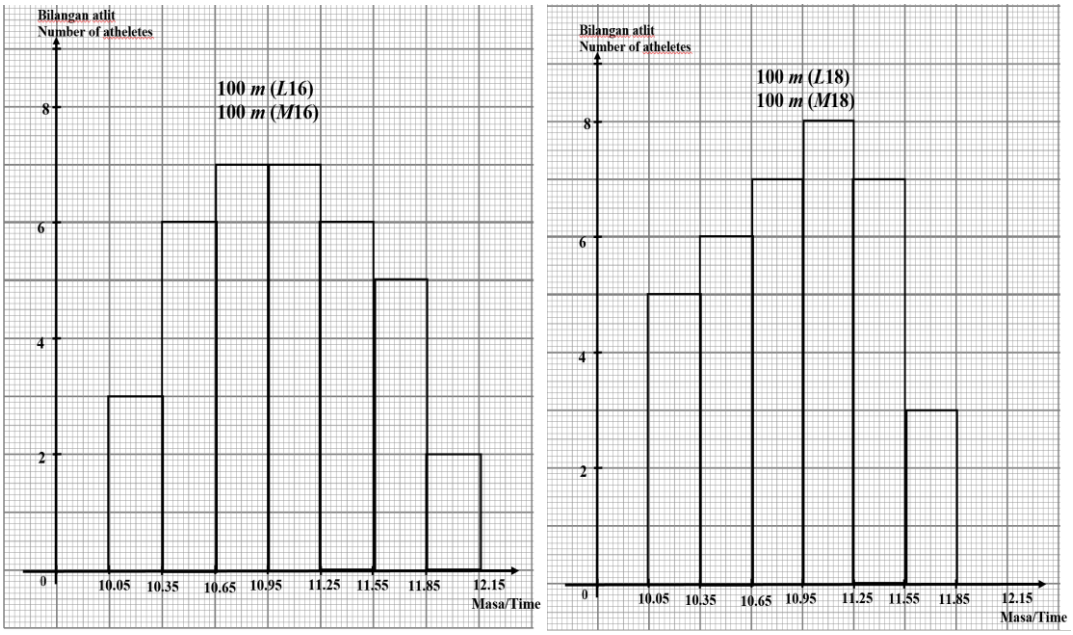
(a) **Q** :

P :

(b)

15 Rajah di bawah menunjukkan dua histogram yang mewakili masa yang diambil oleh atlit dalam acara 100 m (L16) dan 100 m (L18).

The diagram below shows two histograms representing the time taken by athletes in 100 *m (M16) and (M18).*



(i) Nyatakan bentuk taburan histogram bagi kedua-dua acara tersebut.
State the distribution shape of the histogram for the two events.

[2 markah/2 *marks*]

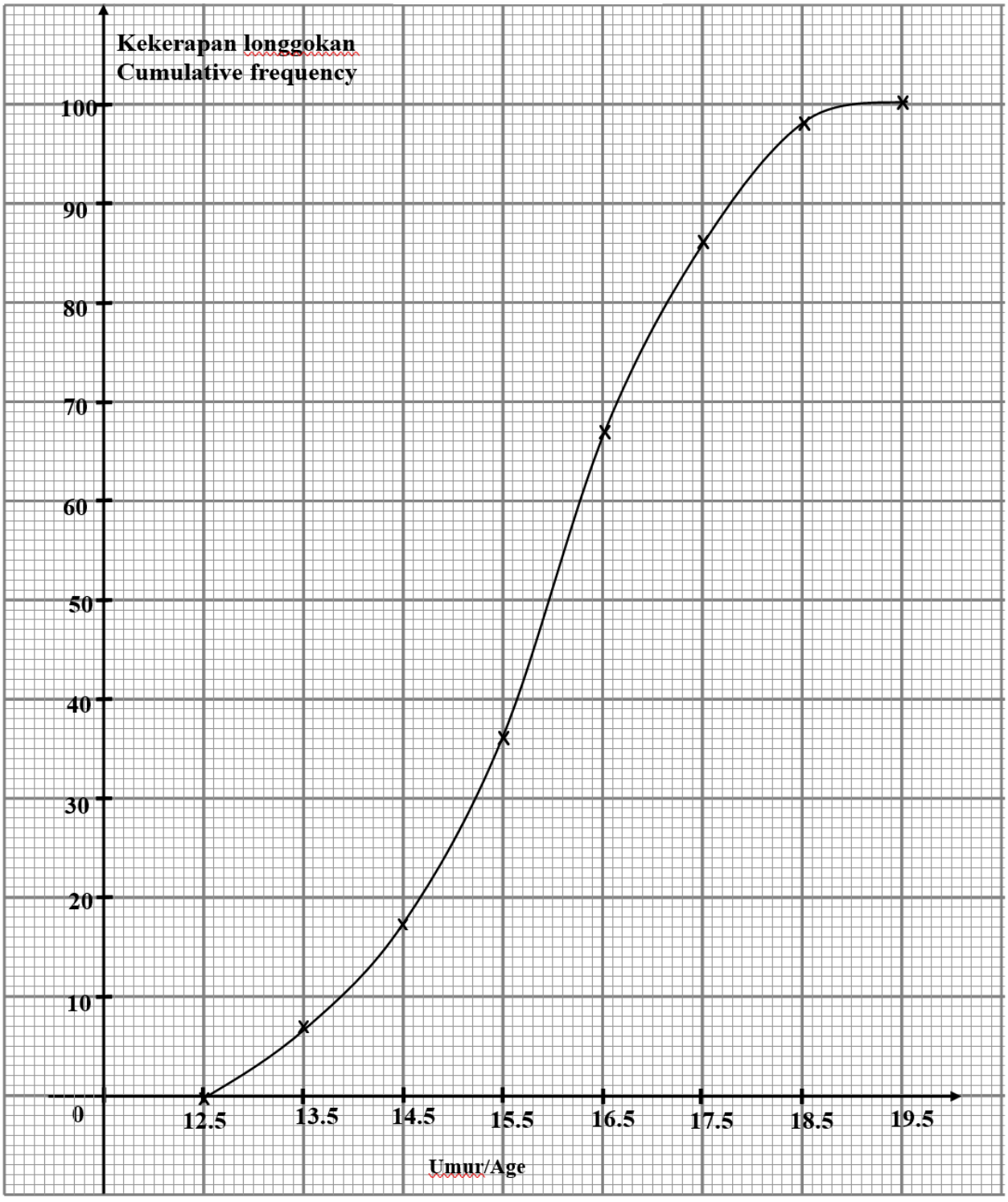
(ii) Bandingkan serakan masa antara kedua-dua acara tersebut.
Compare the distribution of time for the two events.

[1 markah/1 *mark*]

(iii) Acara manakah yang menunjukkan prestasi yang lebih baik?
Which event shows a better performance ?

[1 markah1/ *mark*]

(b) Ogif di bawah menunjukkan umur bagi 100 orang murid di sebuah sekolah.
The ogive below shows the age of 100 students at a school.



(i) Bina plot kotak berdasarkan ogif tersebut.
Construct a box plot based on the ogive.

[3 *markah*]
[3 *marks*]

(ii) Seterusnya, nyatakan julat dan julat antara kuartil berdasarkan plot kotak yang dilukis.
Hence, state the range dan interquartile based on the box plot drawn.

[2 *markah*]
[2 *marks*]

(iii) Nyatakan bentuk taburan bagi data tersebut.
State the distribution shape of the data.

[1 *markah*]
[1 *mark*]

Jawapan : *Answer* :

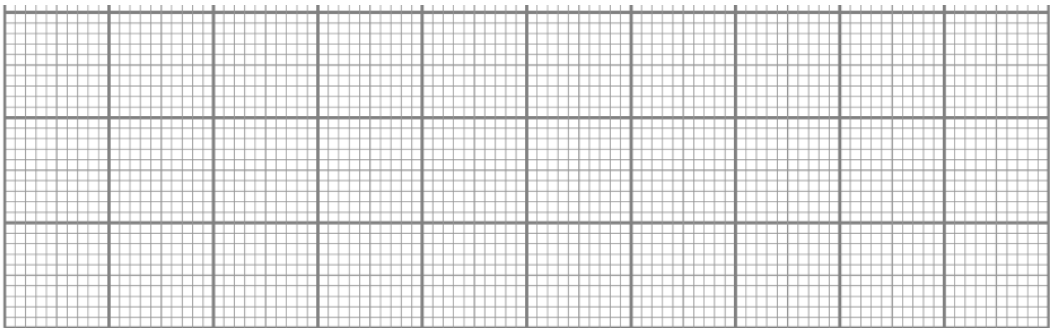
(a) (i) 100 m (L16 / *M16*) :

100 *m* (L18 / *M18*) :

(ii)

(iii)

(b) (i)



(ii)

(iii)

Bahagian C
Section C
[15 markah/*15 marks*]

Jawab mana-mana **satu** soalan dalam bahagian ini.
Answer any one question in this section

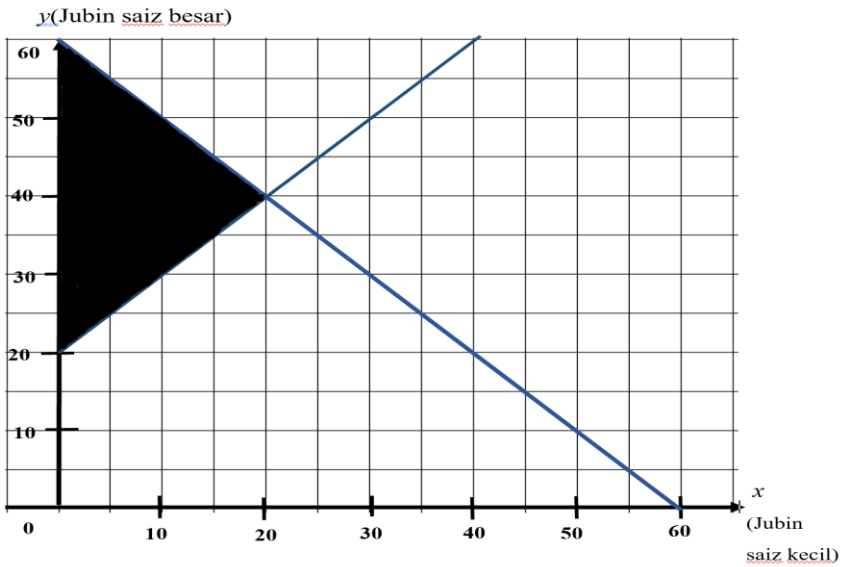
16*(a)* Puan Ana baru saja mengubah suai dapurnya. Dia menggunakan *x* keping jubin saiz kecil dan *y* keping jubin saiz besar untuk lantai dapurnya. Bilangan setiap jenis jubin yang digunakan bergantung kepada kekangan yang berikut:

P*uan Ana has just renovated her kitchen. She uses x small-sized tiles and y big-sized tiles for the floor. The number of each type of tiles used depends on the following constraints:*

I Jumlah bilangan jubin yang digunakan selebih-lebihnya 60 keping.
The total number of tiles used not more than 80 pieces.

II Beza bilangan jubin saiz besar dengan bilangan jubin saiz kecil sekurang-kurangnya 20 keping.
The different number of big-sized tiles with the number of small tiles in excess of 20 pieces.

Rajah 16(i) , menunjukkan rantau yang memuaskan semua kekangan di atas.
Diagram 16(i), shows the region that satisfies all the constraints above.



Rajah 16(i)/ *Diagram 16(i)*

Dari graf,
From graph,

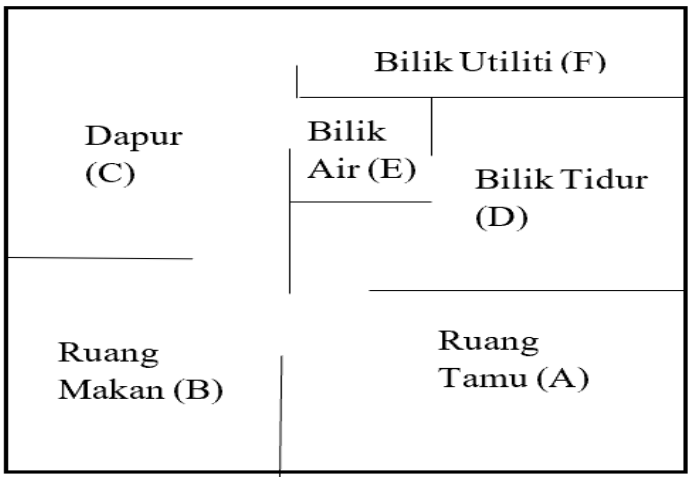
i) Tulis dua ketaksamaan linear selain $x \geq 0$ dan $y \geq 0$
Write two linear inequalities other than $x \geq 0$ and $y \geq 0$

[2 markah/2 *marks*]

ii) Tentukan bilangan maksimum jubin bersaiz kecil apabila jubin bersaiz besar ialah 40 keping.
Satisfy the maximum number of small tiles when the largest tiles is 40 pieces.

[1 markah/1 *mark*]

(b) Rajah 16(ii) menunjukkan pelan dalaman rumah Puan Ana.
Diagram 16*(ii) shows Mrs Ana's house interior plan.*



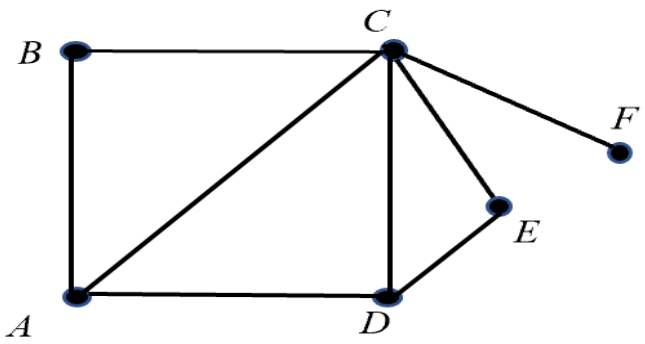
Rajah 16(ii)/ *Diagram 16(ii)*

(i) Lukis satu graf tak terarah berdasarkan pelan dalaman rumah Puan Ana.
Draw an undirected graph based on the interior of Mrs. Ana's house.

[2 markah/2 *marks*]

(ii)Tentukan bilangan darjah berdasarkan graf mudah di bawah dari pelan rumah Puan Ana di bawah.
State the sum degress based on the simple graph below from Mrs. Ana's house plan below.

[2 markah/2 *marks*]



(c) Puan Ana ingin membeli insurans kebakaran untuk rumahnya. Nilai boleh insurans rumah itu ialah RM 550 000. Polisi insurans kebakaran yang ingin dibelinya itu mempunyai ko-insurans untuk menginsuranskan 80% daripada nilai boleh insurans hartanya dan deduktibel sebanyak RM 5 000.

Mrs. Ana would like to buy fire insurance for her house. The disposable value of the house is RM 550 000. The fire insurance policy he wishes to purchase has a co-insurance to insure 80% of the disposable value of his property and deductible of RM 5 000.

(i) Hitung jumlah insurans yang harus dibeli oleh Puan Ana bagi rumahnya itu.
Calculate the amount of insurance Mrs. Ana had to buy for her house.

[2 markah/2 *marks*]

(ii) Rumah Puan Ana telah mengalami kebakaran dan jumlah kerugiannya adalah sebanyak RM 80 000. Hitung bayaran pampasan yang akan diterima Puan Anna jika dia menginsuranskan rumahnya ,
Mrs Ana's house has been damaged by fire and the amount of loss is as much as RM 80 000. Calculate the compensation payment that Mrs. Ana will receive if she insured her home,

(a) pada jumlah insurans yang harus dibelinya.
on the amount of insurance she must purchase.

[2 markah/2 *marks*]

(b) dengan jumlah RM 350 000.
amount of RM 350 000.

[2 markah/2 *marks*]

(iii)Rumah Puan Ana telah mengalami kerugian menyeluruh. Jika dia menginsuranskan rumahnya dengan jumlah RM 400 000, hitung bayaran pampasan yang akan diterimanya.
Mrs Ana's house had suffered a complete loss. If he insured his house for RM 400 000, calculate the compensation fee he would receive.

[2 markah/*2 marks*]

Jawapan/*Answer:*

a i)

ii)

b i)

ii)

c i)

ii) *a)*

b)

iii)

17*(a)* Encik Talib adalah seorang pekerja kilang. Pendapatan tahunannya pada tahun 2020 ialah RM 44 400. Dia juga menderma kepada organisasi yang diluluskan oleh kerajaan berjumlah RM 500. Diberi bahawa jumlah pelepasan yang dituntut ialah RM 12 530.

Mr. Talib is a factory worker. Its annual income in 2020 is RM 44 400. He also donated to an organisation approved by the government amounting to RM 500. It is given that the total discharge claimed is RM 12 530.

Banjaran Pendapatan Bercukai(RM) *Chargeable income(RM)*	Pengiraan(RM) *Calculations(RM)*	Kadar(%) *Rate (%)*	Cukai(RM) *Tax*(RM)
50 01-20 000	5 000 pertama/ *on the first 5 000* 15 000 berikutnya/ *next 15 000*	1	0 150
20 001-35 000	20 000 pertama/ *on the first 20 000* 15 000 berikutnya/ *next 15 000*	3	150 450
35 001-50 000	35 000 pertama/ *on the first 35 000* 15 000 berikutnya/ *next 15 000*	8	600 1200

(i) Hitung cukai pendapatan yang perlu dibayar oleh Encik Talib.
Calculate the income tax payable by Mr Talib.

[4 markah/4 *marks*]

(ii) Jika PCB sebanyak RM 70 telah ditolak setiap bulan daripada gajinya, perlukah Encik Talib menambah bayaran cukai pendapatannya? Jelaskan jawapan anda.
If PCB of RM 70 is deducted monthly from his salary, should Mr Talib increase his income tax payment? Explain your answer.

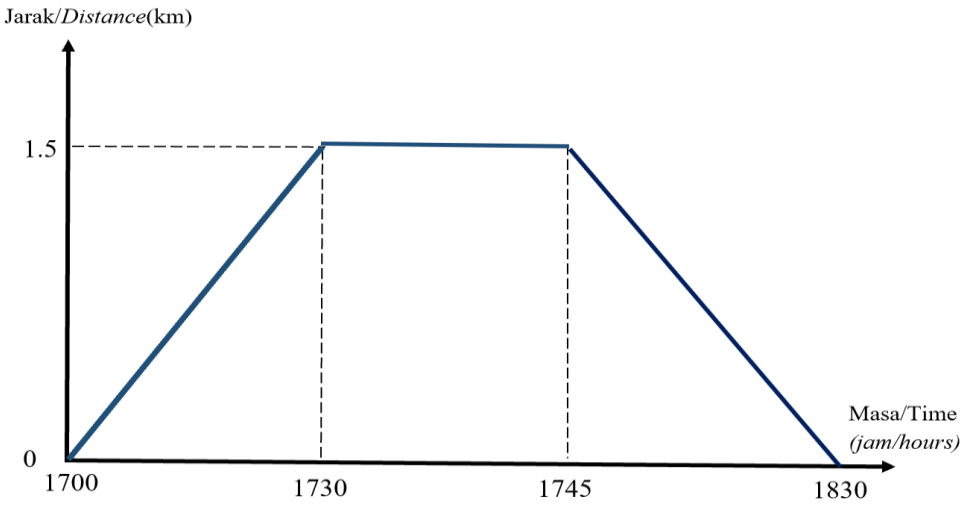
[2 markah/2 *marks*]

(b) Encik Talib menggunakan lebihan cukai untuk membeli dua pasang kasut sukan berjenama x dan y. Dia telah membayar sejumlah RM 625 untuk kedua-dua pasang kasut itu. Harga kasut jenama y lebih mahal sebanyak 1.5 kali ganda daripada harga kasut x.
Dengan menggunakan kaedah matriks hitung harga sepasang kasut x dan sepasang kasut y.
Mr Talib used the tax surplus to buy two pairs of branded sports shoes x and y. He paid a total of 625 ringgit for both pairs of shoes. The price of a y brand shoe is 1.5 times the price of an x shoe. Using the matrix method calculate the price of a pair of x shoes and a pair of y shoes.

[5 markah/5 *marks*]

(c) Encik Talib meluangkan masa berjoging pada hujung minggu dengan menggunakan kasut yang baru dibelinya untuk membakar kalori dalam tubuh. Rajah 17 menunjukkan pergerakan Encik Talib berjoging pada hujung minggu. Encik Talib akan berhenti sebentar apabila sampai di kawasan rehat sebelum pulang ke rumahnya semula.

Mr Talib spent time jogging over the weekend using shoes he had just bought to burn calories in the body. Diagram 17 shows Mr Talib jogging over the weekend. Mr Talib will stop for a while when he reaches the rest area before returning home.



Rajah 17/ Diagram 17

Berdasarkan Rajah 17 diatas ,
Based on diagram 17 above ,

(i) Nyatakan tempoh masa Encik Talib berada dikawasan rehat.
Specify the length of time Mr Talib was in the rest of the area.

[1 markah/1 *marks*]

(ii) Berapakah jarak keseluruhan perjalanan Encik Talib dari rumahnya ke kawasan rehat dan kemudian kembali ke rumahnya semula sewaktu berjogging.
What is the total distance Mr Talib's entire journey from his home to the rest area and then returned to his home again during the jog.

[1 markah/1 *marks*]

(iii)Seterusnya, hitung laju purata dalam kmj^{-1}, keseluruhan perjalanan berjogging Encik Talib.
Hence, calculate the average speed in kmj^{-1}, the entire trip jogging Mr. Talib.

[2 markah/2 *marks*]

Jawapan/*Answer:*

a) i)

ii)

b)

c) i)

ii)

iii)

KERTAS SOALAN TAMAT
END OF QUESTION PAPER

MAKLUMAT UNTUK CALON

1 . *Kertas soalan ini mengandungi tiga bahagian:* **Bahagian A** , **Bahagian B dan Bahagian C.**

2. *Jawab* **semua** *soalan daripada* **Bahagian A dan Bahagian B** *dan* 1 soalan daripada **Bahagian C.**

3. *Jawapan hendaklah ditulis dengan jelas dalam ruang yang disediakan dalam kertas soalan.*

4. *Tunjukkan langkah-langkah penting. Ini boleh membantu anda untuk mendapatkan markah.*

5. *Sekiranya anda hendak menukarkan jawapan, batalkan jawapan itu. Kemudian tuliskan jawapan yang baru.*

6. *Rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan.*

7. *Markah yang diperuntukkan bagi setiap soalan dan ceraian soalan ditunjukkan dalam kurungan.*

8. *Satu senarai rumus disediakan di halaman 2 dan 3 .*

9. Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.

10. *Kertas soalan ini hendaklah diserahkan di akhir peperiksaan.*

INFORMATION FOR CANDIDATES

1. *This question paper consists of two section* : **Sections A, Sections B** *and* **Sections C.** .

2. *Answer* **all** *questions question in* **Sections A and Sections B** *and* 1 questions in **Sections C.**

3. *Write your answers clearly in the spaces provided in the question paper*

4. *Show your working. It may help your to get marks.*

5. *If you wish to change your answer, neatly cross out the answer that you have done. Then write down new answer.*

6. *The diagrams in the questions provided are not drawn to scale unless stated.*

7. *The marks allocated for each question and sub-part of a question are shown in brackets.*

8. *A list of formulae is provided on pages 2 and 3.*

9. You may use a non-programmable scientifIc calculator.

10. *This question paper must be handed in at the end of the examination.*

SULIT
1449/2
Matematik
Kertas 2
Peraturan
Pemarkahan
Oktober
2021

SKEMA MODUL PERCUBAAN SPM
SET 1
2021

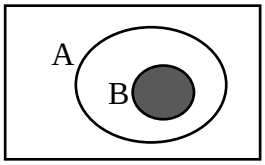
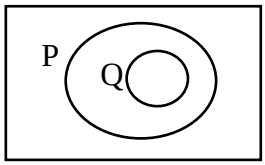
MATEMATIK

Kertas 2

PERATURAN PEMARKAHAN

Peraturan pemarkahan ini mengandungi 11 halaman bercetak

Bahagian A
[40 *markah* **]**

No	Peraturan Pemarkahan	Markah	
1.	(a)  (b) 	1 2	**3**
2	$x^2 - 3x - 28 = 0$ $(x - 7)(x + 4) = 0$ $x = 7$ Perimeter = 22	1 1 1 1	**4**
3	$3m + 12n = 42$ @ $6m + 4n = 24$ $-10n = -30$ $n = 3$ $m = 2$	1 1 1 1	**4**
4	(a) $m = -\frac{1}{2}$ $3 = (-\frac{1}{2})(6) + c$ $y = -\frac{1}{2}x + 6$ (b) $0 = -\frac{1}{2}x + 6$ $x = 12$	1 1 1 1 1	**5**
5	$8 \times 8 \times 8$ $\frac{1}{3}(8 \times 8)5$ $(8 \times 8 \times 8) + \frac{1}{3}(8 \times 8)5$ $= 618.67$ @ $618\frac{2}{3}$	1 1 1 1	**4**

<table>
<tr><th>No</th><th>Peraturan Pemarkahan</th><th colspan="2">Markah</th></tr>
<tr><td>6</td><td>$\frac{30}{360}$X $\frac{22}{7}$X 7^2 @ $\frac{60}{360}$X $\frac{22}{7}$X 14^2 @ $\frac{60}{360}$X $\frac{22}{7}$X 7^2

$\frac{60}{360}$X $\frac{22}{7}$X 14^2 - $\frac{60}{360}$X $\frac{22}{7}$X 7^2 + $\frac{30}{360}$X $\frac{22}{7}$X 7^2

$89\ \frac{5}{6}$ @ 89.83</td><td>1

1

1</td><td>3</td></tr>
<tr><td>7</td><td>$\begin{pmatrix}2 & 4\\3 & 5\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix} = \begin{pmatrix}26\\35\end{pmatrix}$
$\begin{pmatrix}x\\y\end{pmatrix} = -\frac{1}{2}\begin{pmatrix}5 & -4\\-3 & 2\end{pmatrix}\begin{pmatrix}26\\35\end{pmatrix}$
$\begin{pmatrix}x\\y\end{pmatrix} = \begin{pmatrix}5\\4\end{pmatrix}$

x= 5, y=4</td><td>1

1

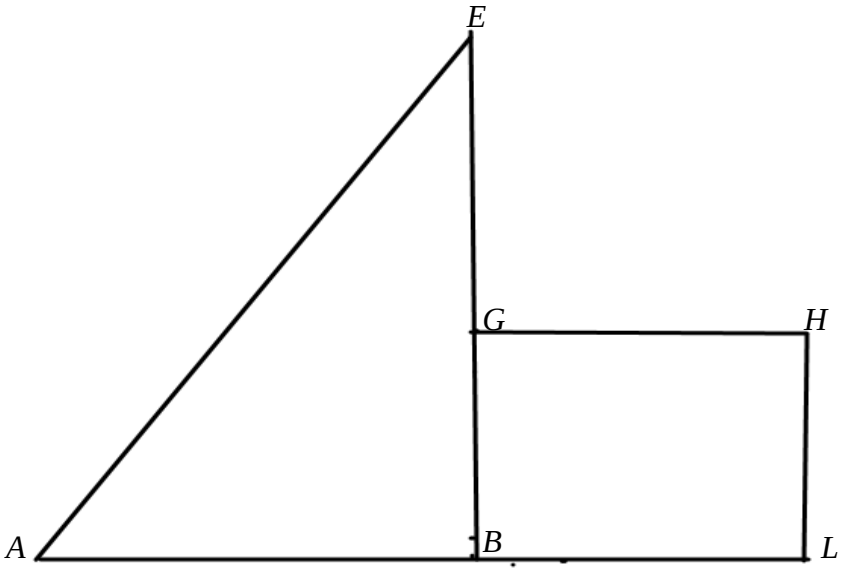
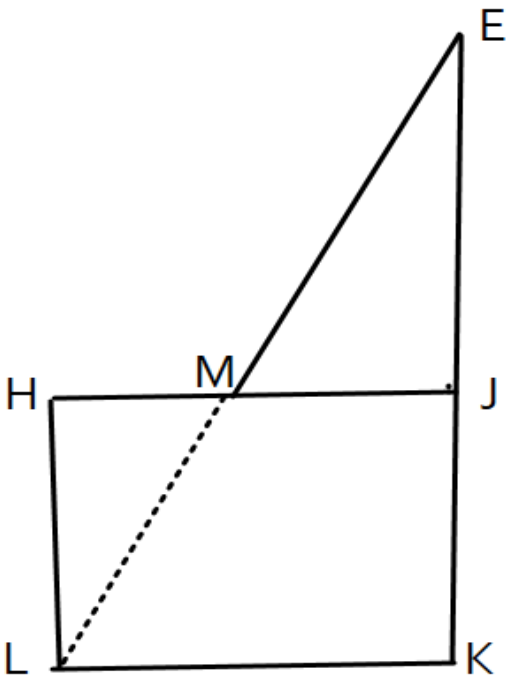
1,1</td><td>4</td></tr>
<tr><td>8</td><td>(a) $\frac{1}{2}$(12+6) 10 + $\frac{1}{2}$(10+22) 6
$\frac{186}{18}$
10.33
(b)Motorsikal bergerak dengan laju seragam 10ms^{-1}</td><td>1
1
1
1</td><td>4</td></tr>
<tr><td>9</td><td>(a) 20% daripada 30 ialah 6 jika dan hanya jika 0.2 X 30 = 60
(b) (i)15 ialah gandaan 3
(ii) sah dan tidak munasabah</td><td>1
1
1,1</td><td>4</td></tr>
<tr><td>10</td><td>(a)
<table>
<tr><td></td><td>A</td><td>B</td><td>C</td></tr>
<tr><td>1</td><td>(1,A)</td><td>(1,B)</td><td>(1,C)</td></tr>
<tr><td>2</td><td>(2,A)</td><td>(2,B)</td><td>(2,C)</td></tr>
<tr><td>3</td><td>(3,A)</td><td>(3,B)</td><td>(3,C)</td></tr>
<tr><td>4</td><td>(4,A)</td><td>(4,B)</td><td>(4,C)</td></tr>
<tr><td>5</td><td>(5,A)</td><td>(5,B)</td><td>(5,C)</td></tr>
</table>
(b)(i) {(1,B),(1,C),(2,B),(,2C),(3,B),(3,,C)}
$\frac{6}{15}$
(ii) {(1,A), (2,A), (3,A), (4,A), (4,B), (4,C), (5,A), (5,B), (5,C)}
$\frac{9}{15}$</td><td>1

1

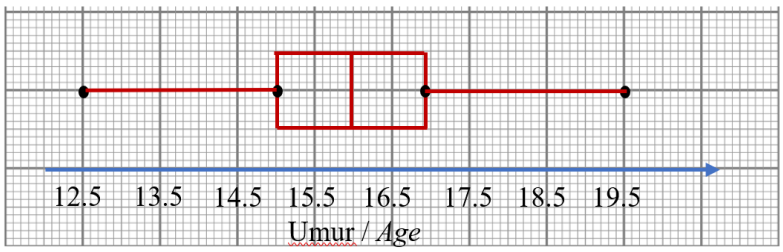
1
1</td><td>5</td></tr>
</table>

Bahagian B
[45 *markah*]

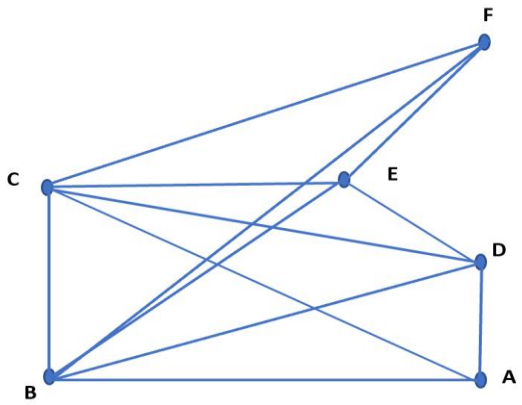
No	Peraturan Pemarkahan	Markah	
11 (a)	-8	**1**	
	2.7	**1**	**2**
(b)	Graph Axes drawn in correct directions with uniform scales for - $4 \leq x \leq 4$ and $-8 \leq y \leq 8$.	**1**	
	All 6 points and *2 points correctly plotted or the curve passes through all the points for - $4 \leq x \leq 4$ and $-8 \leq y \leq 8$.	**2**	
	Note : 6 or 7 points correctly plotted, award K1		
	Smooth and continuous curve without any straight line passing through all 8 correct points using the given scales for - $4 \leq x \leq 4$ and $-8 \leq y \leq 8$.	**1**	**4**
(c) (i)	-1.7 ± 0.1	**1**	
(ii)	3.1 ± 0.1	**1**	**2**
			9
12 (a)	Correct shape with triangle ABE and rectangle BLHG. All solid lines.	**1**	
	EB > BA > BL = EG > GB	**1**	
	Measurements correct to $\pm$ 0.2 cm (one way) and all right angles at vertices = $90^\circ \pm 1^\circ$.	**2**	**4**

No	Peraturan Pemarkahan	Markah	
(b)	  Correct shape with rectangle LKJH and triangle MJE. All solid lines. (Ignore LM) L – M is joined by a dashed line to form trapezium LKJM. LK = KE > EJ = JM > MH = HL Measurements correct to $\pm$ 0.2 cm (one way) and all right angles at vertices = 90˚ $\pm$ 1˚.	**1** **1** **1** **2**	**5** **9**

No	Peraturan Pemarkahan			Markah	
13 (a)	$(65000 \times 0.1) \div 8$			**1**	
	812.50			**1**	
					2
(b) (i)	Pelan kewangan Seon Ho/ *Seon Ho's financial plan*				
	Butiran/*Details*	**(RM)**			
	Gaji bersih/*Net Salary*	7500			
	Gaji guru komputer/Computer teacher salary	500			
	Pendapatan pasif sewa bulanan/*Passive monthly rental income*	800			
	Jumlah pendapatan bulanan/ *Total Monthly income*	**8800**		**2**	
	Tolak simpanan tetap bulanan	750			
	Baki pendapatan/ *Income Balance*		**8050**		
	Tolak perbelanjaan tetap bulanan/ *Deduct monthly fixed expenses*				
	Ansuran pinjaman rumah (1)/ *Home Loan Installment(1)*	970			
	Ansuran pinjaman rumah (2)/ *Home Loan Installment(2)*	890		**1**	
	Ansuran kereta/ *Car installments*	1300			
	Premium insurans/ *Insurance premium*	540			
	Jumlah perbelanjaan tetap bulanan/ *Monthly fixed expenses*		**3700**	**1**	
				1	
	Tolak jumlah perbelanjaan tidak tetap bulanan/ *Deduct monthly non- fixed expenses*				
(ii)	Perbelanjaan makanan/*Food Expenses*	950			
	Utiliti rumah/*Home utilities*	450			
	Percutian & pelancongan/*Holidays &tourism*	800		**2**	**7**
	Tol dan petrol/*Toll and petrol*	300			**9**
	Elaun ibu bapa bulanan/ *Monthly parental allowance*	1200			
	Jumlah perbelanjaan tidak tetap / *Monthly non- fixed expenses*		**3700**		
	Pendapatan lebihan/*Surplus income*		**650**		
	Terdapat lebihan pendapatan sebanyak RM650 bagi pelan kewangan peribadi Seon Ho iaitu aliran tunai positif. Jumlah pendapatan melebihi perbelanjaan menyebabkan kecairan aset yang baik. *There is a surplus of RM650 for Seon Ho's personal financial plan, which is a positive cash flow. Total income exceeds expenses resulting in good asset liquidity.*				

No	Peraturan Pemarkahan	Markah	
14 (a)	**Q** – Putaran 90˚ ikut arah jam, pada pusat (1, 2) *A clockwise rotation of 90˚ about the centre (1, 2)* Note : 1. Putaran 90˚ ikut arah jam atau Putaran, pusat (1, 2) // *A clockwise rotation of 90˚* or *Rotation, centre* (1, 2) , beri P2 2. Putaran // *Rotation* , beri 1markah	**3**	
	P – Pembesaran, faktor skala 2, pusat (3, 5)@E *Enlargement, scale factor 2, centre (3, 5)@E* Note : 1. Pembesaran, faktor skala 2 atau Pembesaran, pusat (3, 5) // *Enlargement, scale factor* 2 *or Enlargement, centre* (3, 5), beri P2. 2. Pembesaran // *Enlargement* , beri 1markah	**3**	
		2	**6**
(b)	$\frac{54}{*2^2-1}$ Note : $54 = *2^2x - x$, beri K1 18	**1**	**3** **9**
15 (a) (i)	Bentuk loceng	**1**	
	Pencong ke kiri	**1**	
(ii)	Masa larian 100 m (L16) terserak lebih luas berbanding 100 m (L18).	**1**	
(iii)	100 m L18 lebih baik kerana mempunyai catatan masa yang lebih baik.	**1**	**4**
(b) (i)		**2**	
(ii)	Nilai minimum = 12.5 Q_1 = 15 Median = 16 Q_3 = 16.9 Nilai maksimum = 19.5	**1** **1**	
(iii)	Garis menyambungkan nilai minimum dengan Q_1, Q_3 dengan nilai maksimum dan garis membentuk kotak. Julat = 7 Julat antara kuartil = 1.9 Taburan simetri	**1** **1**	**5** **10**

Bahagian C
[15 markah/*15 marks* **]**

No	Peraturan Pemarkahan	Markah	
16(a)(i)	$x + y \leq 60$ $y - x \geq 20$	1 1	**3**
(ii)	20	1	
b)	 • Murid melukis 6 bucu • Murid melukis 2 atau lebih garaf tidak terarah ii) Bilangan Darjah = 8 x 2 =16	 1 1 1 1	**4**
c)	i) Jumlah Insurans yang harus dibeli $\frac{80}{100} \times$ RM 550 000 = RM 440 000 ii) a) Bayaran pampasan = RM 80 000 – RM 5 000 RM 75 000 b) i) $\frac{\text{RM } 350\,000}{\text{RM } 440\,000} \times \text{RM } 80\,000 - \text{RM } 5\,000$ RM 58 636.36 iii) RM 400 000 – RM 5 000 RM 395 000	 1 1 1 1 1 1 1 1	**8** **15**

No	Peraturan Pemarkahan	Markah	
17(a)	Pendapatan bercukai = RM 44 400 – RM 500 – RM 12 530 = RM 31 370 Cukai pendapatan = RM 150 + (RM 11 370 x 0.03) – RM 400 = RM 491.10 – RM 400 = RM 91.10 (RM 70 x 12) – RM 91.10 = RM 748.90 PCB > Cukai. Encik Talib tidak perlu menambah bayaran cukai pendapatan. Dia mendapat lebihan sebanyak RM 748.90.	1 1 1 1 1 1	**6**
(b)	$x + y = 625$ @ $\frac{3}{2}x - y = 0$ $y = \frac{3}{2}x$ atau $3x - 2y = 0$ $\begin{pmatrix} 1 & 1 \\ \frac{3}{2} & -1 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 625 \\ 0 \end{pmatrix}$ $\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{1(-1) - (\frac{3}{2})(1)}\begin{pmatrix} -1 & -1 \\ -\frac{3}{2} & 1 \end{pmatrix}\begin{pmatrix} 625 \\ 0 \end{pmatrix}$ $\begin{pmatrix} 250 \\ 375 \end{pmatrix}$ $x =$ RM 250 , $y =$ RM 375	1 1 1 1 1	**5**
(c)	i) 15 minit 1.5 + 1.5 = 3 km Laju purata = $\frac{3}{1.5}$ i) = 2 kmj^{-}	1 1 1 1	**4** **15**

LAMPIRAN

Graf $y = \frac{8}{x}$